United States
Department of
Agriculture

Natural
Resources
Conservation
Service

Washington Basin Outlook Report March 1, 1999

Basin Outlook Reports
and
Federal - State - Private
Cooperative Snow Surveys

For more water supply and resource management information, contact:

Local Natural Resources Conservation Service Field Office

or

Scott Pattee
Water Supply Specialist
Natural Resources Conservation Service
2021 E. College Way, Suite 214
Mt. Vernon, WA 98273-2873
(360) 428-7684

or

Chris Bieker
Public Affairs Specialist
Natural Resources Conservation Service
316 W. Boone Ave., Suite 450
Spokane, WA 99201-2348
(509) 323-2912

How forecasts are made

Most of the annual streamflow in the western United States originates as snowfall that has accumulated in the mountains during the winter and early spring. As the snowpack accumulates, hydrologists estimate the runoff that will occur when it melts. Measurements of snow water equivalent at selected manual snow courses and automated SNOTEL sites, along with precipitation, antecedent streamflow, and indices of the El Niño / Southern Oscillation are used in computerized statistical and simulation models to prepare runoff forecasts. These forecasts are coordinated between hydrologists in the Natural Resources Conservation Service and the National Weather Service. Unless otherwise specified, all forecasts are for flows that would occur naturally without any upstream influences.

Forecasts of any kind, of course, are not perfect. Streamflow forecast uncertainty arises from three primary sources: (1) uncertain knowledge of future weather conditions, (2) uncertainty in the forecasting procedure, and (3) errors in the data. The forecast, therefore, must be interpreted not as a single value but rather as a range of values with specific probabilities of occurrence. The middle of the range is expressed by the 50% exceedance probability forecast, for which there is a 50% chance that the actual flow will be above, and a 50% chance that the actual flow will be below, this value. To describe the expected range around this 50% value, four other forecasts are provided, two smaller values (90% and 70% exceedance probability) and two larger values (30%, and 10% exceedance probability). For example, there is a 90% chance that the actual flow will be more than the 90% exceedance probability forecast. The others can be interpreted similarly.

The wider the spread among these values, the more uncertain the forecast. As the season progresses, forecasts become more accurate, primarily because a greater portion of the future weather conditions become known; this is reflected by a narrowing of the range around the 50% exceedance probability forecast. Users should take this uncertainty into consideration when making operational decisions by selecting forecasts corresponding to the level of risk they are willing to assume about the amount of water to be expected. If users anticipate receiving a lesser supply of water, or if they wish to increase their chances of having an adequate supply of water for their operations, they may want to base their decisions on the 90% or 70% exceedance probability forecasts, or something in between. On the other hand, if users are concerned about receiving too much water (for example, threat of flooding), they may want to base their decisions on the 30% or 10% exceedance probability forecasts, or something in between. Regardless of the forecast value users choose for operations, they should be prepared to deal with either more or less water. (Users should remember that even if the 90% exceedance probability forecast is used, there is still a 10% chance of receiving less than this amount.) By using the exceedance probability information, users can easily determine the chances of receiving more or less water.

Washington
Water Supply Outlook

March 1999

General Outlook

The snow continued to pile up throughout the month of February. All basins in Washington reported increases in snow-water-equivalent. There were 27 SNOTEL sites and four river basins that met or exceeded the previous maximum snowpack readings. Please turn to page five for a detailed listing of March 1 SNOTEL site maximum record snowpack. Monthly precipitation records were set at both Olympia and Quillayute for the month of February. Streamflow forecasts for this spring indicate a high potential for flooding on many streams and rivers.

Snowpack

The March 1 statewide SNOTEL readings were much above normal at 176% of average. The Pend Oreille River Basin snow surveys, including Canadian data, reported the lowest readings at 123% of average. The Omak Creek Basin reported the highest snowpack readings at 276% of average. Westside averages from SNOTEL, combined with March 1 snow survey data, showed the North Puget Sound river basins with 170% of average, the Central Puget river basins with 158%, and the Olympic Peninsula basins with 233% of average. Snowpack along the east slopes of the Cascade Mountains included the Yakima area with 171% and the Wenatchee area with 159%. Snowpack in the Spokane River Basin was at 140% and the Lower Snake River Basin, had 146% of average. Maximum snow cover in Washington was at Paradise Park SNOTEL near Mount Rainer, with a water content of 83.3 inches. This site would normally have 47.9 inches of water content on March 1. Last year at this time Paradise Park had 58.3 inches of snow water equivalent. The highest average in the state was Moses Mountain SNOTEL in Okanogan County with 276% of average.

BASIN	PERCENT OF LAST YEAR	PERCENT OF AVERAGE
Spokane	169	140
Newman Lake	168	177
Pend Oreille	169	123
Okanogan	155	151
Methow	158	172
Similkameen	194	145
Wenatchee	153	158
Chelan	141	154
Stemilt Creek	139	164
Yakima	152	171
Ahtanum Creek	155	161
Walla Walla	197	157
Lower Snake	156	146
Cowlitz	154	178
Lewis	158	213
White	130	164
Green	142	124
Puyallup	130	164
Cedar	151	178
Snoqualmie	153	157
Skykomish	150	148
Skagit	180	174
Baker	180	169
Nooksack	195	167
Olympic Peninsula	203	233

Precipitation

During the month of February, the National Weather Service and Natural Resources Conservation Service climate stations showed well above average precipitation for all river basins in Washington. The highest percent of average mountain precipitation in the state was at Thunder Basin SNOTEL in the North Cascade Mountains. Thunder Basin reported 376% of average for a total of 20.7 inches. The average for this site is 5.5 inches for February.

The previous rainfall record set at the Olympia Airport for the month of February was 13.18 inches of rain, set in 1961. February 1999 precipitation exceeded that record by 2.32 inches, setting a new record at 15.5 inches of rain. The Quillayute Airport near Forks also set a new record. Quillayute received a total of 20.6 inches of rain. Exceeding the previous record set in 1982, by 5.60 inches.

Basin averages for the water-year varied from 158% of average in the Olympic Peninsula river basins to 121% of average in the Walla Walla river basins. The highest individual site average for the water-year was 255% of average at Thunder Basin SNOTEL site in the North Cascade Mountains.

RIVER BASIN	FEBRUARY PERCENT OF AVERAGE	WATER YEAR PERCENT OF AVERAGE
Spokane	180	130
Colville-Pend Oreille	201	135
Okanogan-Methow	270	150
Wenatchee-Chelan	205	151
Upper Yakima	190	147
Lower Yakima	200	149
Walla Walla	138	121
Lower Snake	188	128
Cowlitz-Lewis	214	153
White-Green-Puyallup	174	138
Central Puget Sound	172	150
North Puget Sound	201	146
Olympic Peninsula	260	158

Reservoir

Most reservoir operators in Washington are beginning to prepare for a heavy runoff season by reducing current storage behind the dams. March and April snowpack accumulations will govern late winter releases in anticipation of spring runoff. Reservoir storage in the Yakima Basin was 463,500 acre feet, or 83% of average for the upper reaches and 133,000 acre feet, 95% of average for Rimrock and Bumping Lakes. Storage at the Okanogan reservoirs was 139% of average for March 1. The power generation reservoirs included the following: Coeur d'Alene Lake, 163,500 acre feet, or 110% of average and 69% of capacity; Chelan Lake, 249,300 acre feet, 148% of average and 37% of capacity; and Ross Lake at 218% of average and 48% of capacity.

BASIN	PERCENT OF CAPACITY	PERCENT OF AVERAGE
Spokane	69	110
Colville-Pend Oreille	N/A	N/A
Okanogan-Methow	83	139
Wenatchee-Chelan	37	148
Upper Yakima	56	83
Lower Yakima	57	95
Five Yakima Reservoirs	56	86
North Puget Sound	48	218

For more information contact your local Natural Resources Conservation Service office.

Streamflow

March 1 forecasts indicate above normal summer flows for all streams in the state. They vary from 212% of average for the Colville River at Kettle Falls to 113% of average for the Priest River near Priest River, ID. March forecasts for some Western Washington streams include: Cedar River near Cedar Falls, 133%; Green River, 115%; and the Skagit River, 135%. Some Eastern Washington streams include the Yakima River near Parker, 140%; the Wenatchee River at Peshastin, 140%; and the Spokane River near Post Falls, 136%. Volumetric forecasts are developed using current, historic, and average snowpack and precipitation and streamflow data collected and coordinated by organizations cooperating with NRCS.

Streamflows reported for February varied from well above to well below average. The South Fork Walla Walla River near Milton Freewater had the highest flows with 172% of average. The Similkameen River at Nighthawk with only 46% of average, had the lowest in the state. Other streamflows were the following percentage of average: the Priest River, 129%; the Columbia at the International Boundary, 114%; the Spokane at Spokane, 94%; the Columbia below Rock Island Dam, 107%; the Cle Elum River near Roslyn, 72%; and the Snake River below Ice Harbor Dam, 118%.

BASIN	PERCENT OF AVERAGE MOST PROBABLE FORECAST (50 PERCENT CHANCE OF EXCEEDENCE)
Spokane	136-137
Colville-Pend Oreille	113-212
Okanogan-Methow	143-162
Wenatchee-Chelan	126-149
Upper Yakima	137-141
Lower Yakima	126-140
Walla Walla	128-183
Lower Snake	129-138
Cowlitz-Lewis	135-186
White-Green-Puyallup	115-117
Central Puget Sound	119-139
North Puget Sound	127-139
Olympic Peninsula	131-137

STREAM	PERCENT OF AVERAGE FEBRUARY STREAMFLOWS
Pend Oreille Below Box Canyon	96
Kettle at Laurier	128
Columbia at Birchbank	114
Spokane at Long Lake	109
Similkameen at Nighthawk	46
Okanogan at Tonasket	134
Methow at Pateros	91
Chelan at Chelan	115
Wenatchee at Pashastin	80
Yakima at Cle Elum	58
Yakima at Parker	75
Naches at Naches	65
Grande Ronde at Troy	106
Snake below Lower Granite Dam	101
SF Walla Walla near Milton Freewater	172
Lewis at Ariel	129
Cowlitz below Mayfield Dam	90
Skagit at Concrete	88

For more information contact your local Natural Resources Conservation Service office.

BASIN SUMMARY OF SNOW COURSE DATA

MARCH 1999

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-90
ABERDEEN LAKE CAN.	4000	2/23/99	22	5.5	4.7	5.7
AHTANUM R.S.	3100	3/01/99	---	13.3E	6.5	6.8
ALPINE MEADOWS	3500	2/26/99	146	58.0	34.5	33.8
ALPINE MEADOWS PILL	3500	3/01/99	---	45.2	41.6	37.1
AMBROSE	6480	2/22/99	50	14.6	8.4	11.0
ASHLEY DIVIDE	4820	2/22/99	25	6.6	4.4	6.4
BADGER PASS PILLOW	6900	3/01/99	---	39.3	18.4	30.8
BAREE MIDWAY	4600	2/25/99	129	43.7	20.8	30.5
BAREE TRAIL	3800	2/25/99	42	13.5	5.6	8.6
BARKER LAKES PILLOW	8250	3/01/99	---	13.0	9.0	12.2
BARNES CREEK CAN.	4950	2/26/99	70	25.0	--	16.9
BASIN CREEK PILLOW	7180	2/24/99	31	10.7	7.2	6.5
BASSOO PEAK	5150	2/25/99	38	10.7	5.1	10.0
BEAVER CREEK TRAIL	2200	2/26/99	117	27.0	10.6	12.6
BEAVER PASS	3680	2/26/99	150	51.1	24.9	25.1
BERNE-MILL CREEK (d)	3170	2/26/99	115	37.7	22.5	24.7
BIG WHITE MTN CAN.	5100	2/27/99	73	23.2	15.6	15.9
BLACK MOUNTAIN	7750	2/25/99	40	11.2	12.2	12.2
BLACK PINE PILLOW	7100	3/01/99	---	13.4	6.6	10.5
BLACKWALL PEAK CAN.	6370	3/01/99	---	47.2	22.8	29.6
BLEWETT PASS#2PILLOW	4270	3/01/99	---	18.2	15.2	17.0
BLUE LAKE	5900	3/01/99	---	27.9E	12.0	22.0
BRENDA MINE CAN.	4450	3/01/99	---	17.0	10.4	11.5
BRIEF	1600	2/25/99	30	9.9	7.2	6.9
BRUSH CREEK TIMBER	5000	2/25/99	31	7.6	4.2	8.6
BULL MOUNTAIN	6600	2/26/99	29	7.8	3.2	5.2
BUMPING LAKE (NEW)	3400	2/26/99	84	26.4	24.6	17.6
BUMPING RIDGE PILLOW	4600	3/01/99	---	49.4	26.7	18.4
BUNCHGRASS MDWPILLOW	5000	3/01/99	---	41.3	24.0	22.7
CARMI CAN.	3800	2/28/99	22	6.0	5.9	5.8
CAYUSE PASS	5300	3/01/99	---	94.0E	78.3	65.3
CHESSMAN RESERVOIR	6200	2/23/99	14	3.2	1.8	3.4
CHICKEN CREEK	4060	2/26/99	62	16.7	12.1	14.3
CHIWAUKUM G.S.	2500	2/26/99	55	17.6	11.0	10.7
CLOUDY PASS AM	6500	3/01/99	---	50.0E	47.9	32.9
COMBINATION PILLOW	5600	3/01/99	---	5.9	3.5	5.1
COPPER BOTTOM PILLOW	5200	3/01/99	---	13.8	5.2	10.0
COPPER CREEK	5700	2/28/99	54	17.5	6.5	13.4
COPPER MOUNTAIN	7700	2/24/99	37	10.7	8.5	9.1
CORNER CREEK	3150	2/23/99	40	10.5	6.6	6.9
CORRAL PASS PILLOW	6000	3/01/99	---	42.9	30.2	27.6
COTTONWOOD CREEK	6400	2/25/99	24	6.6	6.2	6.5
COUGAR MTN. PILLOW	3200	3/01/99	---	25.6	15.6	18.6
COX VALLEY	4500	3/01/99	---	60.0E	36.4	32.4
COYOTE HILL	4200	2/24/99	42	10.6	7.0	9.5
DALY CREEK PILLOW	5780	3/01/99	---	12.6	8.5	10.0
DESERT MOUNTAIN	5600	2/22/99	45	12.9	10.2	13.2
DEVILS PARK	5900	2/25/99	169	61.6	31.2	36.9
DISCOVERY BASIN	7050	2/24/99	34	9.6	7.7	8.6
DIX HILL	6400	2/28/99	40	11.4	7.9	10.7
DOMMERIE FLATS	2200	2/24/99	29	10.9	4.5	7.7
EAST FORK R.S.	5400	2/28/99	26	7.2	4.6	6.0
EAST RAGGED SADDLE	3740	2/27/99	78	28.1	19.9	17.7
EASY PASS AM	5200	3/01/99	---	110.0E	61.3	64.5
EL DORADO MINE	7800	3/01/99	---	20.5E	15.4	16.7
ELBOW LAKE PILLOW	3200	3/01/99	148	61.3	28.4	29.8
EMERY CREEK PILLOW	4350	3/01/99	---	15.3	8.8	14.0
ENDERBY CAN.	5800	2/26/99	125	47.2	31.9	32.7
ESPERON CK. UP CAN.	5050	2/28/99	66	21.8	11.7	14.3
FARRON CAN.	3700	2/24/99	47	12.7	11.7	11.9
FATTY CREEK	5500	3/01/99	---	21.9E	13.4	20.2
FISH CREEK	8000	2/24/99	34	13.8	8.2	7.8
FISH LAKE	3370	2/25/99	147	51.0	31.0	29.3
FISH LAKE PILLOW	3370	3/01/99	---	51.5	28.3	28.4
FLATTOP MTN PILLOW	6300	3/01/99	---	54.0	30.7	40.9
FLEECER RIDGE	7500	2/26/99	40	14.2	6.0	9.0
FOURTH OF JULY SUM	3200	2/22/99	51	13.8	6.6	8.4
FREEZEOUT CK. TRAIL	3500	2/27/99	70	20.1	10.1	11.1
FROHNER MDWS PILLOW	6480	3/01/99	---	6.6	5.0	7.2
GOAT CREEK	3600	2/24/99	33	8.1	6.8	6.4
GRASS MOUNTAIN #2	2900	3/02/99	38	11.5	3.7	13.9
GRAVE CRK PILLOW	4300	3/01/99	---	16.2	12.1	15.2
GRAYSTOKE LAKE CAN.	5500	3/01/99	54	17.3	8.4	13.3
GREEN LAKE	6000	3/01/99	---	50.0E	35.9	29.1
GREEN LAKE PILLOW	6000	3/01/99	110	35.0	21.6	17.5
GREYBACK RES CAN.	4700	3/01/99	35	9.6	6.7	7.7
GRIFFIN CR DIVIDE	5150	2/25/99	39	11.6	4.8	10.0
GROUSE CAMP PILLOW	5380	3/01/99	---	30.7	18.3	17.1
HAMILTON HILL CAN.	4550	3/01/99	55	15.9	8.7	13.2
HAND CREEK PILLOW	5030	3/01/99	---	13.0	6.9	10.9
HARTS PASS PILLOW	6500	3/01/99	---	61.0E	36.0	34.6
HELL ROARING DIVIDE	5770	2/26/99	90	30.7	16.0	26.4
HERRIG JUNCTION	4850	2/26/99	87	29.7	18.2	21.7
HIGH RIDGE PILLOW	4980	3/01/99	---	28.9	16.4	21.6
HOLBROOK	4530	3/02/99	35	10.7	5.4	8.8
HOODOO BASIN PILLOW	6050	3/01/99	---	56.0	27.3	39.7
HUMBOLDT GLCH PILLOW	4250	3/01/99	---	18.5	8.5	12.8
HURRICANE	4500	3/06/99	151	52.2E	14.2	17.4
INTERGAARD	6450	2/25/99	23	6.6	6.2	6.8
ISINTOK LAKE CAN.	5100	2/24/99	31	8.3	4.3	6.3
JUNE LAKE PILLOW	3200	3/01/99	---	66.9	40.2	33.6
KISHENEHN	3890	2/25/99	32	9.5	6.2	7.5
KIT CARSON PASTURE	4950	2/23/99	31	7.8	8.0	7.8
KLESILKWA CAN.	3450	2/26/99	63	19.4	8.7	11.1
KRAFT CREEK PILLOW	4750	3/01/99	---	14.4	9.4	14.5
LESTER CREEK	3100	3/02/99	79	23.4	17.0	17.7
LIGHTNING LAKE CAN.	3700	2/28/99	65	19.6	10.9	10.2
LOGAN CREEK	4300	2/25/99	28	7.5	3.8	6.7
LOLO PASS PILLOW	5240	3/01/99	---	42.6	19.2	28.0
LONE PINE PILLOW	3800	3/01/99	---	70.4	39.2	28.1
LOOKOUT PILLOW	5140	3/01/99	---	40.1	22.3	28.0
LOST HORSE MTN CAN.	5850	3/01/99	---	11.0E	6.6	7.6
LOST HORSE PILLOW	5000	3/01/99	---	32.0	23.7	25.6
LOST LAKE PILLOW	6110	3/01/99	---	67.5	36.3	52.7
LOWER SANDS CREEK #2	3120	2/24/99	72	23.6	15.9	16.9
LUBRECHT FOREST NO 3	5450	2/25/99	27	6.8	3.4	6.3
LUBRECHT FOREST NO 4	4650	2/26/99	13	3.3	1.4	3.1
LUBRECHT FOREST NO 6	4040	2/26/99	14	4.1	1.2	3.7
LUBRECHT HYDROPLOT	4200	2/25/99	25	6.4	3.4	6.4
LUBRECHT PILLOW	4680	3/01/99	---	6.1	4.5	5.8
LYMAN LAKE PILLOW	5900	3/01/99	---	77.6	58.0	48.4
LYNN LAKE	4000	3/02/99	66	20.7	18.7	16.0
MARIAS PASS	5250	2/25/99	59	20.5	10.2	14.9
MCCULLOCH CAN.	3900	2/25/99	25	6.6	6.0	6.1
MEADOWS CABIN	1900	2/26/99	21	6.1	.3	6.2
MEADOWS PASS PILLOW	3240	3/01/99	---	34.7	22.0	18.1
MERRITT	2140	2/26/99	62	22.8	11.6	14.4
MICA CREEK PILLOW	4750	3/01/99	---	33.3	17.4	--
MINERAL CREEK	4000	2/27/99	63	20.4	14.4	15.9
MISSEZULA MTN CAN.	4700	2/27/99	40	11.8	6.1	8.8
MISSION CREEK CAN.	5800	3/01/99	64	23.9	13.3	17.2
MISSION RIDGE	5000	2/26/99	71	23.2	19.4	14.0
MONASHEE PASS CAN.	4200	2/26/99	48	14.9	--	11.9
MOOSE CREEK PILLOW	6200	3/01/99	---	20.0	11.5	14.5
MORRISSEY RIDGE CAN.	6100	3/01/99	---	29.1	18.6	2
MORSE LAKE PILLOW	5400	3/01/99	---	79.0	57.4	
MOSES MTN PILLOW	4800	3/01/99	---	32.3	15.2	
MOSQUITO RDG PILLOW	5200	3/01/99	---	45.8	24.0	32.2
MOULTON RESERVOIR	6850	2/24/99	31	9.8	4.3	5.8
MOUNT CRAG PILLOW	4050	3/01/99	---	65.3	36.8	26.5
MT. KOBAU CAN.	5500	2/28/99	54	16.2	12.8	10.4
MOUNT GARDNER	3300	2/25/99	65	22.5	10.3	14.2
MOUNT GARDNER PILLOW	2860	3/01/99	---	26.1	14.5	14.2
MUTTON CREEK #1	5700	2/24/99	77	23.2	15.7	11.4
N.F. ELK CR PILLOW	6250	3/01/99	---	13.0	6.9	10.8
NEVADA CREEK PILLOW	6480	3/01/99	---	17.4	8.8	11.2
NEW HOZOMEEN LAKE	2800	2/27/99	62	18.0	9.0	10.9
NEZ PERCE CMP PILLOW	5650	3/01/99	---	15.3	10.4	13.0
NEZ PERCE PASS	6570	2/23/99	49	14.7	12.2	16.3
NOISY BASIN PILLOW	6040	3/01/99	---	39.9	26.6	33.7
NORTH FORK JOCKO	6330	2/27/99	123	41.6	29.1	38.2
OLALLIE MDWS PILLOW	3960	3/01/99	---	76.4	47.8	44.6
OLALLIE MEADOWS	3630	3/01/99	---	66.3E	41.5	38.7
OPHIR PARK	7150	2/28/99	54	16.6	9.3	14.7
OYAMA LAKE CAN.	4100	2/27/99	28	7.5	5.9	5.9
PARADISE PARK PILLOW	5500	3/01/99	---	83.3	58.3	47.9
PARK CK RIDGE PILLOW	4600	3/01/99	---	65.9	40.8	40.6
PETERSON MDW PILLOW	7200	3/01/99	---	8.6	7.1	8.5
PIGTAIL PEAK PILLOW	5900	3/01/99	193	67.6	42.9	41.0
PIKE CREEK PILLOW	5930	3/01/99	---	31.2	14.2	22.8
PIPESTONE PASS	7200	2/25/99	21	5.6	4.1	4.1
POPE RIDGE PILLOW	3540	3/01/99	92	28.0	18.6	16.7
POSTILL LAKE CAN.	4200	2/26/99	31	9.0	6.5	7.0
POTATO HILL PILLOW	4500	3/01/99	---	44.4	27.0	21.9
QUARTZ PEAK PILLOW	4700	3/01/99	---	30.5	19.2	18.6
ROUND TOP MTN	4020	2/26/99	56	18.8	13.1	--
RAGGED RIDGE	3330	2/26/99	48	15.6	8.2	7.4
RAINY PASS PILLOW	4780	3/01/99	---	53.2	28.9	32.7
REX RIVER PILLOW	1900	3/01/99	109	41.4	26.6	20.1
ROCKER PEAK PILLOW	8000	3/01/99	---	11.8	10.5	12.6
ROCKY CREEK AM	2100	3/01/99	---	42.0E	23.1	25.2
ROLAND SUMMIT	5120	3/03/99	178	42.5	27.0	28.6
RUSTY CREEK	4000	2/24/99	37	8.6	8.0	6.2
SADDLE MTN PILLOW	7900	3/01/99	---	27.9	17.8	21.9
SAGE CREEK SADDLE	4080	2/23/99	78	22.8	15.4	15.9
SALMON MDWS PILLOW	4500	3/01/99	---	14.4	12.9	8.3
SASSE RIDGE PILLOW	4200	3/01/99	---	53.0	32.3	27.4
SAVAGE PASS PILLOW	6170	3/01/99	---	31.8	17.8	22.9
SAWMILL RIDGE	4700	3/02/99	101	35.3	29.4	29.7
SHEEP CANYON PILLOW	4050	3/01/99	---	68.1E	36.6	3
SILVER STAR MTN CAN.	5600	2/28/99	93	33.2	21.6	
SKALKAHO PILLOW	7260	3/01/99	---	27.0	17.1	2
SKITWISH RIDGE	5110	2/24/99	118	39.9	26.2	27.5
SKOOKUM CREEK PILLOW	3920	3/01/99	---	40.9	22.9	24.9

BASIN SUMMARY OF SNOW COURSE DATA

MARCH 1999

SNOW COURSE	ELEVATION	DATE	SNOW DEPTH	WATER CONTENT	LAST YEAR	AVERAGE 1961-90
SLIDE ROCK MOUNTAIN	7100	3/01/99	---	17.7E	9.5	13.3
SPENCER MDW PILLOW	3400	3/01/99	---	61.9	38.9	27.2
SPIRIT LAKE PILLOW	3100	3/01/99	---	29.5E	6.6	6.6
SPOTTED BEAR MTN.	7000	3/01/99	---	13.9E	7.5	13.3
STAHL PEAK PILLOW	6030	3/01/99	---	37.6	25.7	30.2
STAMPEDE PASS PILLOW	3860	3/01/99	---	55.1	35.6	38.2
STEMILT SLIDE	5000	2/26/99	64	21.9	16.9	12.7
STEMPLE PASS	6600	2/25/99	43	12.0	5.0	8.5
STEVENS PASS PILLOW	4070	3/01/99	---	53.9	33.3	34.7
STEVENS PASS SAND SD	3700	2/26/99	131	45.5	25.5	31.1
STORM LAKE	7780	2/24/99	45	13.2	9.1	10.8
STRYKER BASIN	6180	2/26/99	99	32.1	22.0	28.5
STUART MOUNTAIN	7400	2/27/99	100	34.8	19.8	27.4
SUMMERLAND RES CAN.	5050	2/23/99	35	9.9	6.1	8.4
SUMMIT G.S.	4600	2/24/99	39	10.3	7.7	7.1
SUNSET PILLOW	5540	3/01/99	---	24.5	13.6	25.7
SURPRISE LKS PILLOW	4250	3/01/99	---	70.5	52.6	37.5
TEN MILE LOWER	6600	2/23/99	24	5.6	3.6	6.3
TEN MILE MIDDLE	6800	2/23/99	33	8.0	6.0	9.5
THUNDER BASIN	4200	2/26/99	125	35.0E	15.8	18.5
TINKHAM CREEK PILLOW	3000	3/01/99	---	24.7	25.6	17.2
TOUCHET #2 PILLOW	5530	3/01/99	---	48.5	22.9	27.8
TRAPPING CK LOW CAN.	2850	2/28/99	20	5.9	3.9	5.0
TRAPPING CK UP CAN.	4100	2/27/99	30	9.8	7.2	7.9
TRINKUS LAKE	6100	2/22/99	112	39.9	25.8	36.7
TROUGH #2 PILLOW	5310	3/01/99	-3	13.81	13.5	9.0
TROUT CREEK CAN.	5650	2/25/99	32	9.4	5.5	6.5
TRUMAN CREEK	4060	2/22/99	18	4.6	2.8	5.0
TUNNEL AVENUE	2450	3/02/99	102	36.8	18.6	19.2
TV MOUNTAIN	6800	2/27/99	60	19.2	8.2	15.6
TWELVEMILE PILLOW	5600	3/01/99	---	22.0	13.3	16.4
TWIN CAMP	4100	3/02/99	72	22.3	16.2	21.8
TWIN CREEKS	3580	3/01/99	---	10.9E	5.5	10.7
TWIN LAKES PILLOW	6400	3/01/99	---	50.9	28.2	34.3
TWIN SPIRIT DIVIDE	3480	2/27/99	62	19.5	13.1	13.8
UPPER HOLLAND LAKE	6200	2/22/99	92	31.6	23.6	30.4
UPPER WHEELER PILLOW	4400	3/01/99	---	18.7	12.4	12.1
VASEUX CREEK CAN.	4250	3/01/99	18	4.7	4.9	5.5
WARM SPRINGS PILLOW	7800	3/01/99	---	20.0	16.2	18.2
WEASEL DIVIDE	5450	2/24/99	106	35.6	22.2	29.5
WELLS CREEK PILLOW	4200	3/01/99	126	43.6	25.3	33.2
WHITE PASS ES PILLOW	4500	3/01/99	---	29.7	20.0	20.7
WHITE ROCKS MTN CAN.	7200	2/26/99	96	31.9	17.9	19.3

SNOTEL SITE
SNOWPACK RECORDS
MARCH 1, 1999

Washington had the highest reported snowpack in the Western United States on March 1. Statewide SNOTEL reported 176% of average snow-water-equivalent (SWE). Record maximum SWE was recorded at 27 SNOTEL sites, exceeding previous record snowpack years of 1990, 91, 95, 96, 97 and 98.

SNOTEL site name	March 1, 1999 SWE	Previous Record SWE / Year
Bumping Ridge	48.0	40.8 / 1997
Bunchgrass Meadows	41.1	37.8 / 1997
Elbow Lake	61.2	48.0 / 1997
Fish Lake	51.4	45.0 / 1997
Green Lake	34.9	32.4 / 1997
Grouse Camp	30.7	24.1 / 1995
June Lake	69.6	47.1 / 1997
Lone Pine	70.4	47.7 / 1997
Lost Horse	32.0	28.0 / 1997
Lyman Lake	77.6	74.9 /1991
Morse Lake	78.1	71.4 / 1997
Moses Mountain	32.0	15.2 / 97 & 98
Mount Crag	65.1	36.2 / 1997
Mount Gardner	26.0	24.8 / 1997
Olallie Meadows	76.2	75.5 / 1997
Park Creek Ridge	65.4	60.5 / 1997
Pope Ridge	38.6	27.0 / 1997
Potato Hill	44.4	33.3 / 1997
Quartz Peak	30.7	30.4 / 1997
Rainy Pass	53.2	51.3 / 91 & 96
Rex River	41.1	35.9 / 1997
Sasse Ridge	52.9	49.7 / 1997
Sheep Canyon	68.1	60.5 / 1990
Skookum Creek	40.5	31.9 / 1997
Spencer Meadows	62.0	42.0 / 1997
Surprise Lakes	70.2	59.2 / 1997
Wells Creek	43.2	36.5 / 1997

USDA NRCS
Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

Program Contacts

Leonard Jordan
State Conservationist
W. 316 Boone Ave., Suite 450
Spokane, WA 99201-2348
phone: 509-323-2961
fax: 509-323-2979
leonard.jordan@wa.usda.gov

Chris Bieker
Public Affairs Specialist
W. 316 Boone Ave., Suite 450
Spokane, WA 99201-2348
phone: 509-323-2912
fax: 509-323-2909
chris.bieker@wa.usda.gov

Scott Pattee
Water Supply Specialist
2021 E. College Way, Suite 214
Mount Vernon, WA 98273-2873
phone: 360-428-7684
fax: 360-424-6172
scott.pattee@wa.usda.gov

Chris Pacheco
Resource Conservationist
National Water and Climate Center
101 SW Main St., Suite 1600
Portland, OR 97204-3224
phone: 503-414-3056
fax: 503-414-3101
cpacheco@wcc.nrcs.usda.gov

Helpful Internet Addresses

NRCS Snow Survey and Climate Services Homepages

Washington:
http://www.wa.nrcs.usda.gov/nrcs/CoopSnoSrvy.htm

Oregon:
http://crystal.or.nrcs.usda.gov/snowsurveys

Idaho:
http://idsnow.id.nrcs.usda.gov

National Water and Climate Center (NWCC):
http://www.wcc.nrcs.usda.gov

NWCC Anonymous FTP Server:
ftp.wcc.nrcs.usda.gov

USDA-NRCS Agency Homepages

Washington:
http://www.wa.nrcs.usda.gov/nrcs

NRCS National:
http://www.ftw.nrcs.usda.gov

USDA NRCS
Natural Resources Conservation Service

Washington State
Snow, Water and Climate Services

Field Office Contacts

Eastern Washington

Jimmie Gleaton
District Conservationist
232 Williams Lake Road
Colville, WA 99114-9638
509-685-0937
jimmie.gleaton@wa.usda.gov

Doug Allen
District Conservationist
301 Yakima Street, Room 301
Wenatchee, WA 98801-2966
509-664-0265
doug.allen@wa.usda.gov

Randy Kelley
District Conservationist
1251 Second Ave. South, Room 101
Okanogan, WA 98840-9723
509-422-2750
randy.kelly@wa.usda.gov

David Chain
District Conservationist
607 E. Mountain View
Ellensburg, WA 98926
509-925-8580
david.chain@wa.usda.gov

Western Washington

John Gillies
District Conservationist
6975 Hannegen Road
Lynden, WA 98205-1535
360-354-2035
john.gillies@wa.usda.gov

Kerry Perkins
District Conservationist
111 East 3rd, Room 2B
Port Angeles, WA 98362-3009
360-457-5091
kerry.perkins@wa.usda.gov

Monica Hoover
Wetland Specialist
1835 Black Lake Blvd SW, STE E
Olympia, WA 98512-5623
360-704-7740
monica.hoover@wa.usda.gov

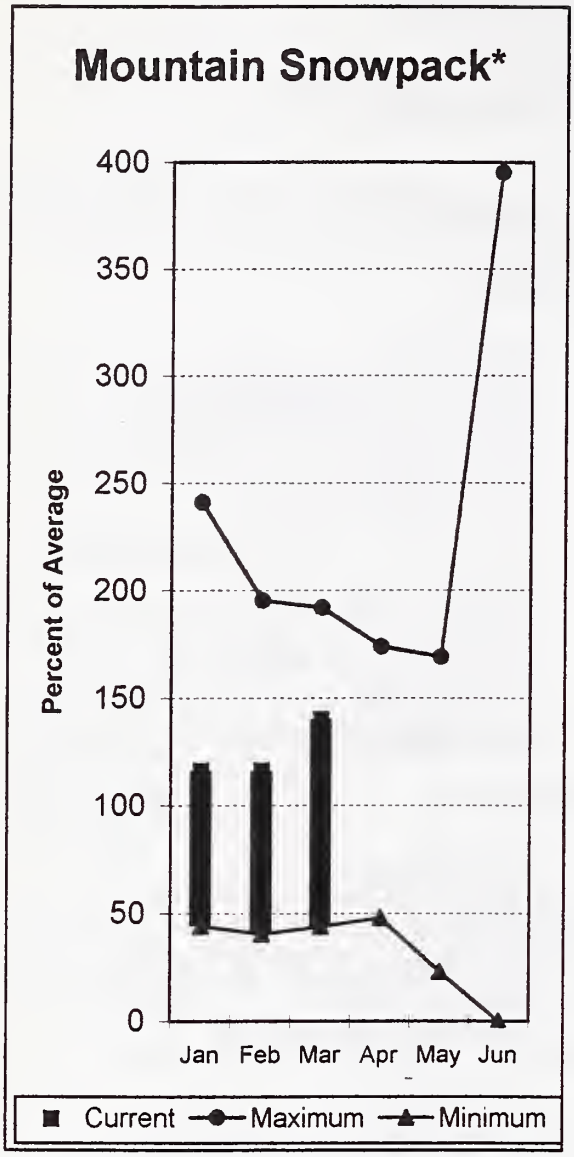
Scott Pattee
Water Supply Specialist
2021 E. College Way, Suite 214
Mount Vernon, WA 98273-2873
360-428-7684
scott.pattee@wa.usda.gov

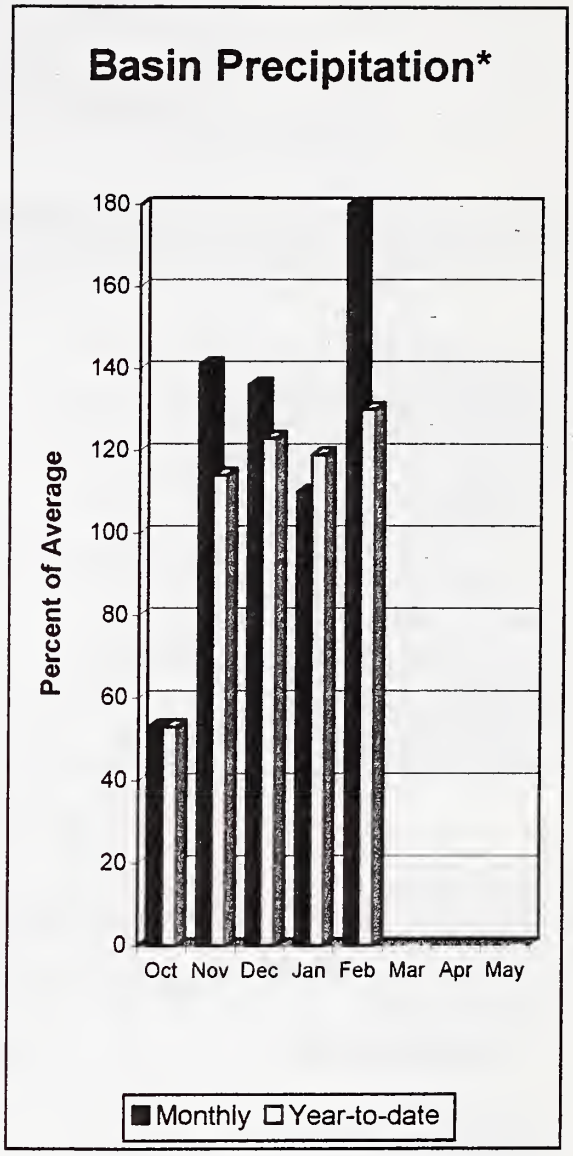
Data Collection Offices

Jon Lea
Oregon Data Collection Office
101 SW Main St., Suite 1300
Portland, OR 97204
503-414-3267
jlea@or.nrcs.usda.gov

Ron Abramovich
Idaho Data Collection Office
9173 West Barnes, Suite C
Boise, ID 83709
208-378-5741
rabramo@id.nrcs.usda.gov

Spokane River Basin





*Based on selected stations

The March 1 forecasts for summer runoff within the Spokane River Basin are 136% of average near Post Falls and 137% of average at Long Lake. The forecasts are based on a basin snowpack that is 140% of average and precipitation that is 130% of average for the water-year. Precipitation for February was above normal at 180% of average. Streamflow for the Spokane River at Long Lake, was 109% of average for February. March 1 storage in Coeur d'Alene Lake, was 163,500 acre feet, 110% of average and 69% of capacity. Snowpack at Quartz Peak SNOTEL site contained 30.5 inches of water, compared to the average March 1 reading of 18.6 inches. This beats the previous March 1 snowpack record of 30.4 inches, set in 1997. Average temperatures in the Spokane Basin were about 2 degrees above normal.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

SPOKANE near Post Falls (2)	APR-SEP	3117	3470		3710	136		3950	4303	2730
	APR-JUL	2998	3344		3580	136		3816	4162	2633
SPOKANE at Long Lake	APR-JUL	3405	3774		4025	137		4276	4645	2936
	APR-SEP	3697	4080		4340	137		4600	4983	3159

SPOKANE RIVER BASIN
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
COEUR D'ALENE	238.5	163.5	103.5	149.1

SPOKANE RIVER BASIN
Watershed Snowpack Analysis - March 1, 1999

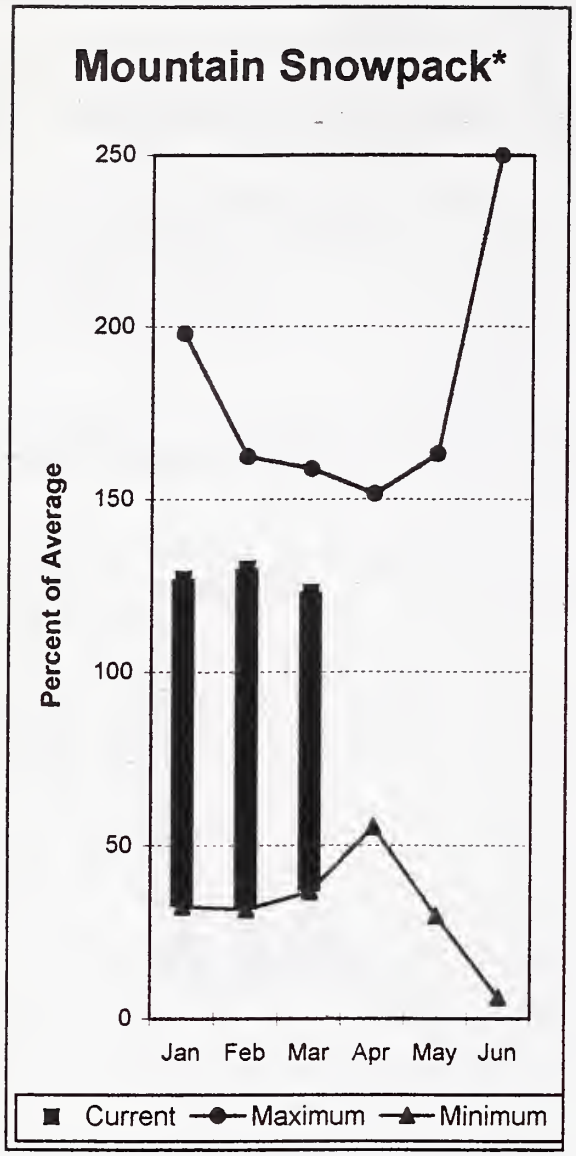
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
SPOKANE RIVER	16	169	140
NEWMAN LAKE	2	168	177

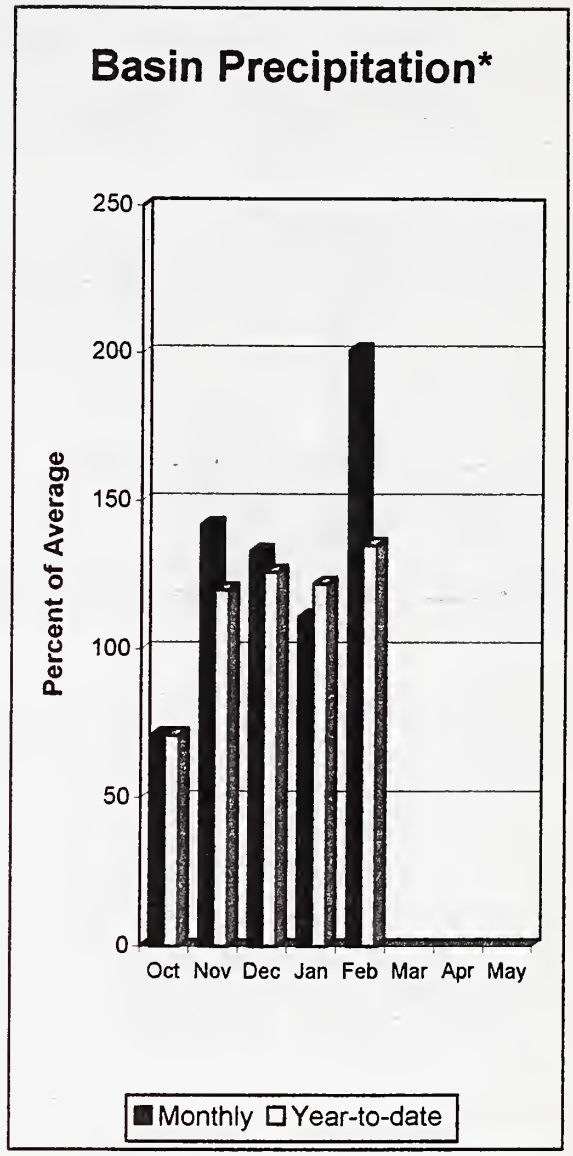
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Colville - Pend Oreille River Basins





*Based on selected stations

The April - September forecast for the Kettle River streamflow is 128% of average; the Pend Oreille below Box Canyon, 116%; and the Priest River near the town of Priest River, 113% of average. February streamflow was 96% of average on the Pend Oreille River; 114% on the Columbia at the International Boundary; and 128% on the Kettle River. March 1 snow cover was 123% of average in the Pend Oreille Basin and 127% of average in the Kettle River Basin. Bunchgrass Meadows SNOTEL site set a new March 1 maximum snowpack record of 41.1 inches. The previous record of 37.8 inches was set in 1997. Average March 1 snowpack for Bunchgrass Meadows is 22.7 inches. Precipitation during February was 201% of average, bringing the year-to-date precipitation to 135% of average. Reservoir storage in Roosevelt and Banks lakes was not available at the time of this printing. Average temperatures were about 2 degrees above normal.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ====== Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
PEND OREILLE Lake Inflow (1,2)	APR-JUL	12225	14340	15300	116	16260	18375	13150
	APR-SEP	13337	15650	16700	116	17750	20063	14370
	APR-JUN	10298	12294	13200	116	14106	16102	11390
PRIEST nr Priest River (1,2)	APR-JUL	703	852	920	113	988	1137	814
	APR-SEP	749	908	980	113	1052	1211	868
PEND OREILLE bl Box Canyon (1,2)	APR-JUL	12783	14651	15500	116	16349	18217	13380
	APR-SEP	13935	15974	16900	116	17826	19865	14590
	APR-JUN	11063	12670	13400	116	14130	15737	11570
COLVILLE at Kettle Falls	APR-SEP	239	262	277	212	292	315	131
	APR-JUL	221	242	256	213	270	291	120
	APR-JUN	207	225	238	214	251	269	111
KETTLE near Laurier	APR-SEP	2064	2249	2375	128	2501	2670	1854
	APR-JUL	1980	2147	2260	128	2373	2540	1761
	APR-JUN	1784	1930	2030	128	2130	2276	1585
COLUMBIA at Birchbank (1,2)	APR-JUL	35770	39229	40800	116	42371	45830	35140
	APR-SEP	44601	48933	50900	116	52867	57199	43810
	APR-JUN	26160	28663	29800	116	30937	33440	25670
COLUMBIA at Grand Coulee Dm (1,2)	APR-SEP	66143	73197	76400	118	79603	86657	64850
	APR-JUL	55700	61614	64300	118	66986	72900	54543
	APR-JUN	43799	48407	50500	118	52593	57201	42756

COLVILLE - PEND OREILLE RIVER BASINS
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
ROOSEVELT		NO REPORT		
BANKS		NO REPORT		

COLVILLE - PEND OREILLE RIVER BASINS
Watershed Snowpack Analysis - March 1, 1999

Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
COLVILLE RIVER	0	0	0
PEND OREILLE RIVER	93	169	123
KETTLE RIVER	8	139	127

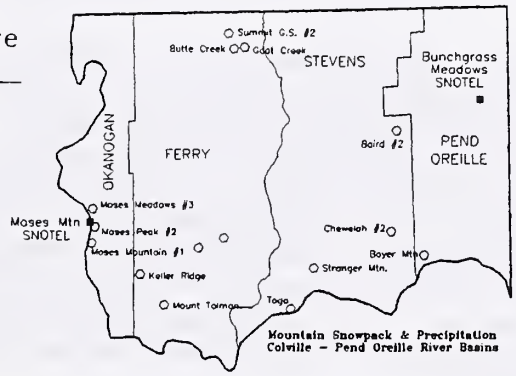
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

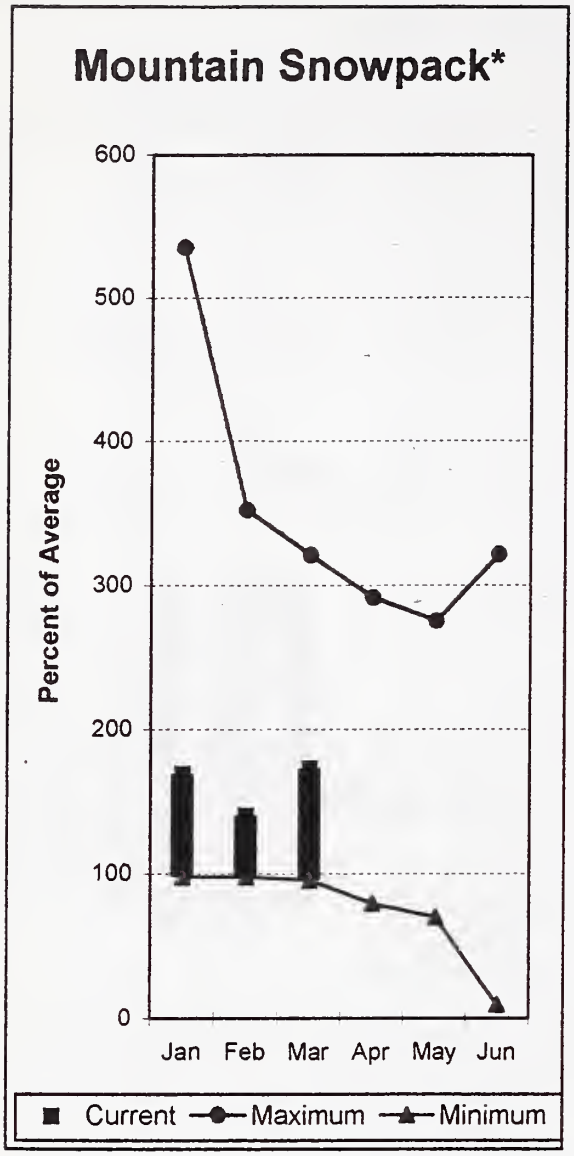
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

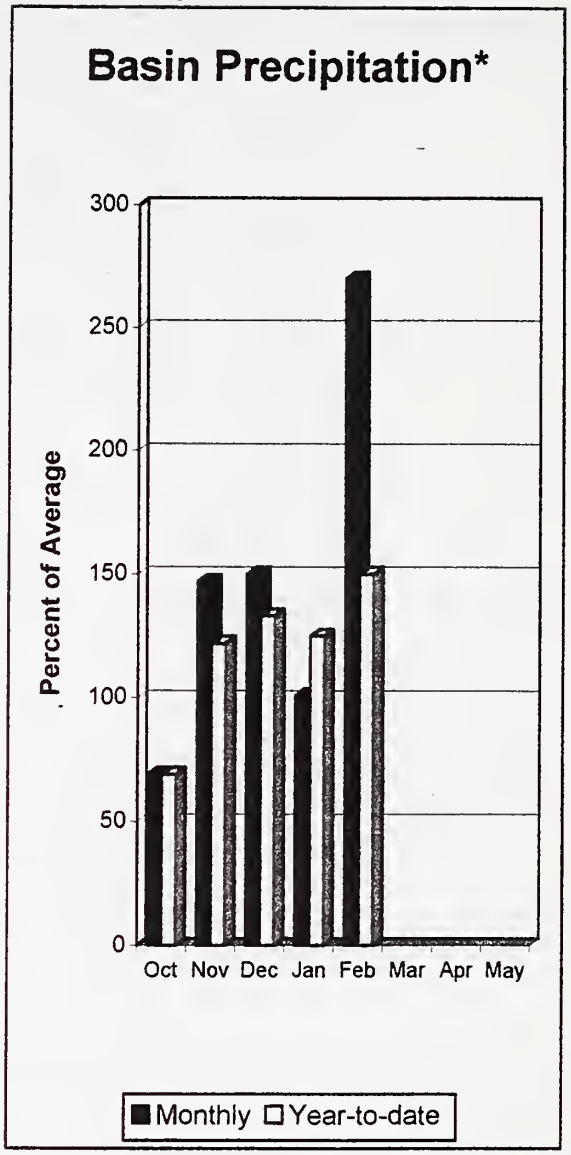
Percent of Average
March 1, 1999

Snowpack - 123%
Precipitation - 135%
Reservoir - N/A



Okanogan - Methow River Basins





*Based on selected stations

Summer runoff forecast for the Okanogan River is 144% of average; the Similkameen River, 143%; the Methow River, 160%; and Salmon Creek, 162% of average. March 1 snow cover on the Okanogan was 151% of average; the Methow, 172%; and the Similkameen River, 145%. Moses Mountain SNOTEL site had a March 1 reading of 32.3 inches or 276% of average, shattering the previous maximum record of 15.2 inches in 1997 and 1998. February precipitation in the Okanogan-Methow was an amazing 270% of average, with precipitation for the water-year at 150% of average. February streamflow for the Methow River was 91% of average; 134% for the Okanogan River; and 46% for the Similkameen. Snow-water-content at the Salmon Meadows SNOTEL, near Conconully, was 14.4 inches. Average for this site is 8.3 inches on March 1. Combined storage in the Conconully Reservoirs was 19,500 acre feet, which is 83% of capacity and 139% of the March 1 average. Temperatures were 5 degrees above normal for the past month.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter ======>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
SIMILKAMEEN near Nighthawk (1)	APR-JUL	1521	1758	1865	143	1972	2209	1304
	APR-SEP	1637	1887	2000	143	2113	2363	1399
	APR-JUN	1289	1496	1590	143	1684	1891	1113
OKANOGAN near Tonasket (1)	APR-JUL	1447	1903	2110	144	2317	2773	1466
	APR-SEP	1602	2103	2330	144	2557	3058	1623
	APR-JUN	1228	1604	1775	144	1946	2322	1233
SALMON CREEK near Conconully	APR-JUL	18.1	26	31	162	36	44	19.1
	APR-SEP	19.1	27	32	162	38	46	20
METHOW RIVER near Pateros	APR-SEP	1372	1454	1510	160	1566	1648	942
	APR-JUL	1288	1364	1415	162	1466	1542	873
	APR-JUN	1089	1164	1215	163	1266	1341	746

OKANOGAN - METHOW RIVER BASINS
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
SALMON LAKE		NO REPORT		
CONCONULLY RESERVOIR		NO REPORT		

OKANOGAN - METHOW RIVER BASINS
Watershed Snowpack Analysis - March 1, 1999

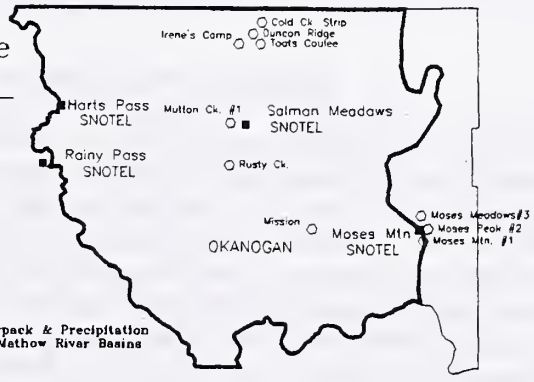
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
OKANOGAN RIVER	22	155	151
OMAK CREEK	1	212	276
SANPOIL RIVER	0	0	0
SIMILKAMEEN RIVER	4	194	145
TOATS COULEE CREEK	1	183	120
CONCONULLY LAKE	3	126	178
METHOW RIVER	5	158	172

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

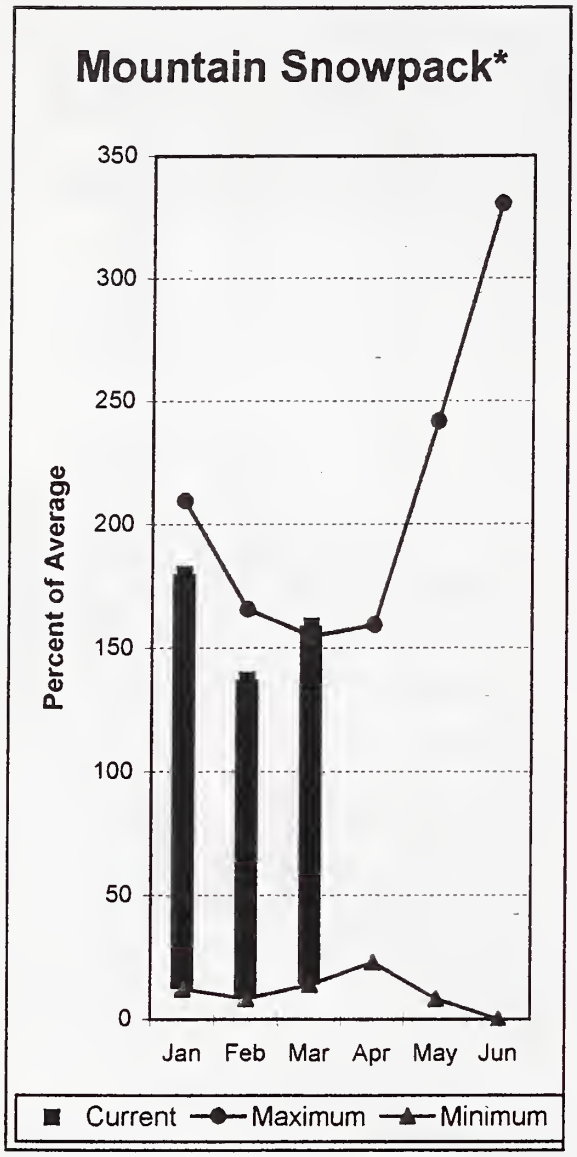
The average is computed for the 1961-1990 base period.

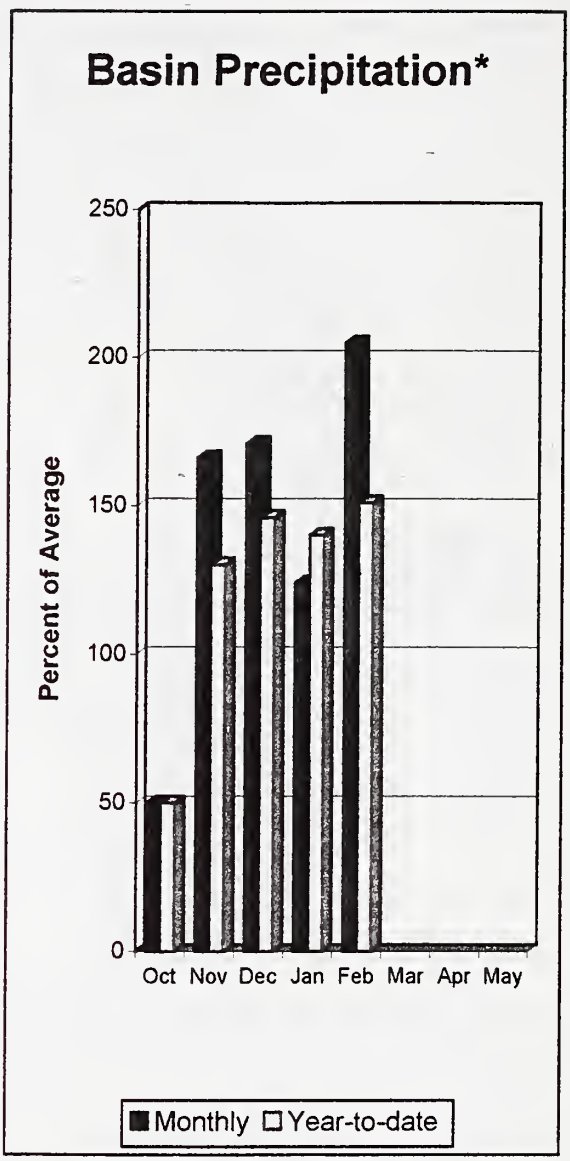
(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Percent of Average
March 1, 1999
Snowpack - 173%
Precipitation - 150%
Reservoir - 139%



Mountain Snowpack & Precipitation
Okanogan - Methow River Basins





*Based on selected stations

Precipitation during February was 205% of average in the combined basin and 151% for the year-to-date. Runoff for the Entiat River is forecast to be 149% of average for the summer. The April-September forecast for the Chelan River is for 136% of average; it is 137% for the Wenatchee River at Plain; and for the Stehekin it is 137% of average. Icicle, Stemilt and Squilchuck creeks are all expected to be above average this summer. February streamflows on the Chelan River were 115% of average. The Wenatchee River averaged 80% of normal flows. March 1 snowpack in the Wenatchee Basin was 158% of average. The Chelan Basin was 154% of average; Colockum Ridge was 153%; and Stemilt Creek was 164% of average. Snowpack in the Entiat River Basin was 161% of average. Reservoir storage in Lake Chelan was 249,300 acre feet, or 148% of March 1 average and 37% of capacity. Lyman Lake SNOTEL had the most snow water equivalent with 77.6 inches of water. This site would normally have 48.4 inches on March 1. Temperatures were 2-5 degrees above normal for February. Lyman Lake, Park Creek Ridge and Pope Ridge SNOTEL sites all set new March 1 snowpack records.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
CHELAN RIVER near Chelan	APR-SEP	1417	1514	1580	136	1646	1743	1160
	APR-JUL	1263	1345	1400	137	1455	1537	1024
	APR-JUN	990	1061	1110	137	1159	1230	812
STEHEKIN near STEHEKIN	APR-SEP	1021	1086	1130	137	1174	1239	827
	APR-JUL	874	925	960	137	995	1046	701
	APR-JUN	663	707	737	137	767	811	538
ENTIAT RIVER near Ardenvoir	APR-SEP	307	325	338	149	351	369	227
	APR-JUL	280	297	308	150	319	336	206
	APR-JUN	225	240	250	148	260	275	169
WENATCHEE at Plain	APR-SEP	1470	1565	1630	137	1695	1790	1190
	APR-JUL	1348	1421	1470	137	1519	1592	1072
	APR-JUN	1098	1150	1185	137	1220	1272	864
WENATCHEE R. at Peshastin	APR-SEP	1757	2074	2290	140	2506	2823	1636
	APR-JUL	1598	1885	2080	140	2275	2562	1485
	APR-JUN	1299	1529	1685	140	1841	2071	1204
STEMILT nr Wenatchee (miners in)	MAY-SEP	133	159	177	128	195	221	138
ICICLE CREEK near Leavenworth	APR-SEP	398	419	434	126	449	470	344
	APR-JUL	371	390	403	127	416	435	318
	APR-JUN	290	313	328	125	343	366	263

WENATCHEE - CHELAN RIVER BASINS
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
CHELAN LAKE	676.1	249.3	335.7	168.1

WENATCHEE - CHELAN RIVER BASINS
Watershed Snowpack Analysis - March 1, 1999

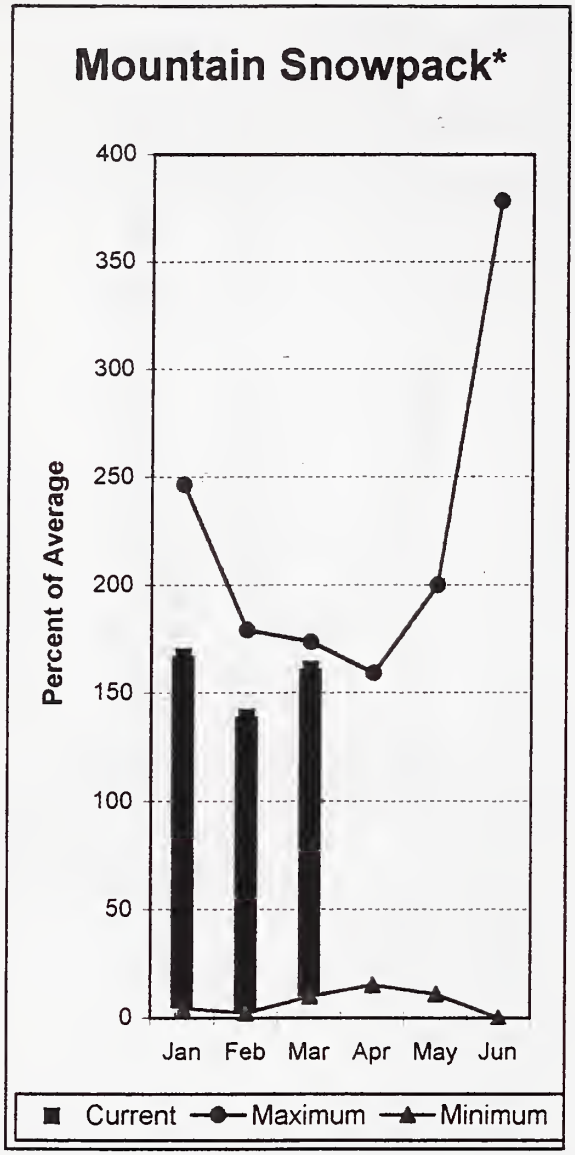
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
CHELAN LAKE BASIN	5	141	154
ENTIAT RIVER	2	147	161
WENATCHEE RIVER	11	156	158
SQUILCHUCK CREEK	0	0	0
STEMILT CREEK	2	139	164
COLOCKUM CREEK	0	0	0

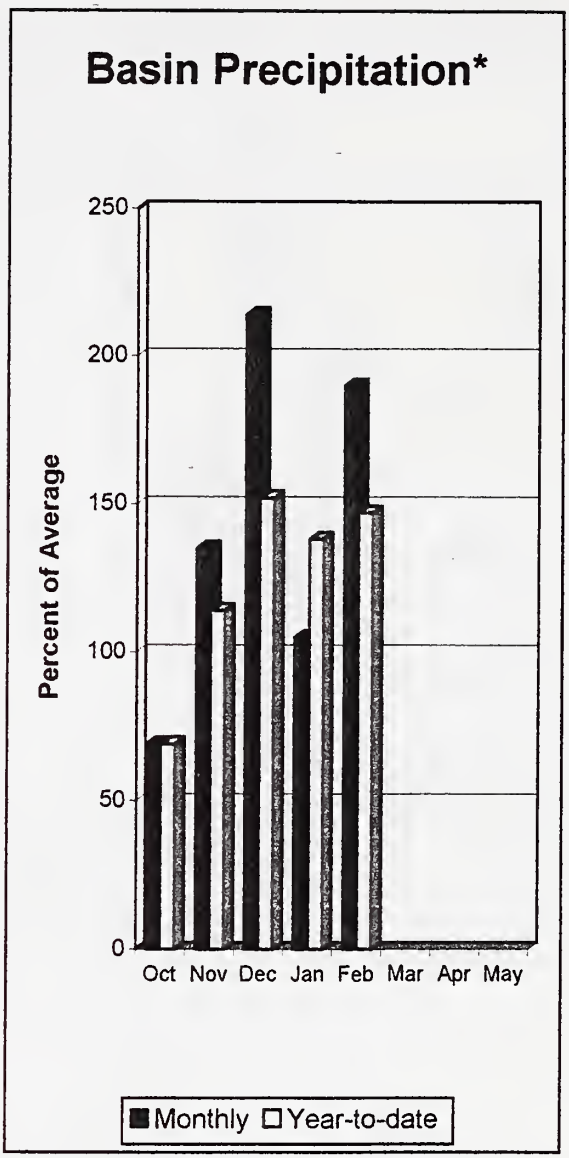
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Upper Yakima River Basin





*Based on selected stations

March 1 reservoir storage for the Upper Yakima reservoirs was 463,500 acre feet, or 83% of average. Forecasts for the Yakima River at Cle Elum are for 137% of average. Lake inflows are all expected to be above average this summer. February streamflows within the basin were: the Yakima near Cle Elum 58% and the Cle Elum River near Roslyn at 72%. March 1 snowpack was 168% based upon 10 snow courses and SNOTEL readings within the Upper Yakima Basin. Fish Lake, Grouse Camp, Olallie Meadows and Sasse Ridge SNOTEL sites all set new record snowpack maximums for March 1 readings. Precipitation was 190% of average for February and 147% for the water-year-to-date. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
KEECHELUS LAKE INFLOW	APR-JUL	157	169	177	143	185	197	124
	APR-SEP	166	180	190	141	200	214	135
	APR-JUN	141	150	156	143	162	171	109
KACHESS LAKE INFLOW	APR-JUL	138	149	157	141	165	176	111
	APR-SEP	144	156	164	139	172	184	118
	APR-JUN	125	134	140	141	146	156	99
CLE ELUM LAKE INFLOW	APR-JUL	524	548	564	138	580	604	409
	APR-SEP	564	594	615	137	636	666	448
	APR-JUN	439	461	475	138	489	511	345
YAKIMA at Cle Elum	APR-JUN	918	964	995	138	1026	1072	721
	APR-JUL	1059	1113	1150	138	1187	1241	832
	APR-SEP	1147	1208	1250	137	1292	1353	915

UPPER YAKIMA RIVER BASIN
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
KEECHELUS	157.8	80.8	131.1	105.0
KACHESS	239.0	164.7	176.3	179.0
CLE ELUM	436.9	218.0	333.9	273.0

UPPER YAKIMA RIVER BASIN
Watershed Snowpack Analysis - March 1, 1999

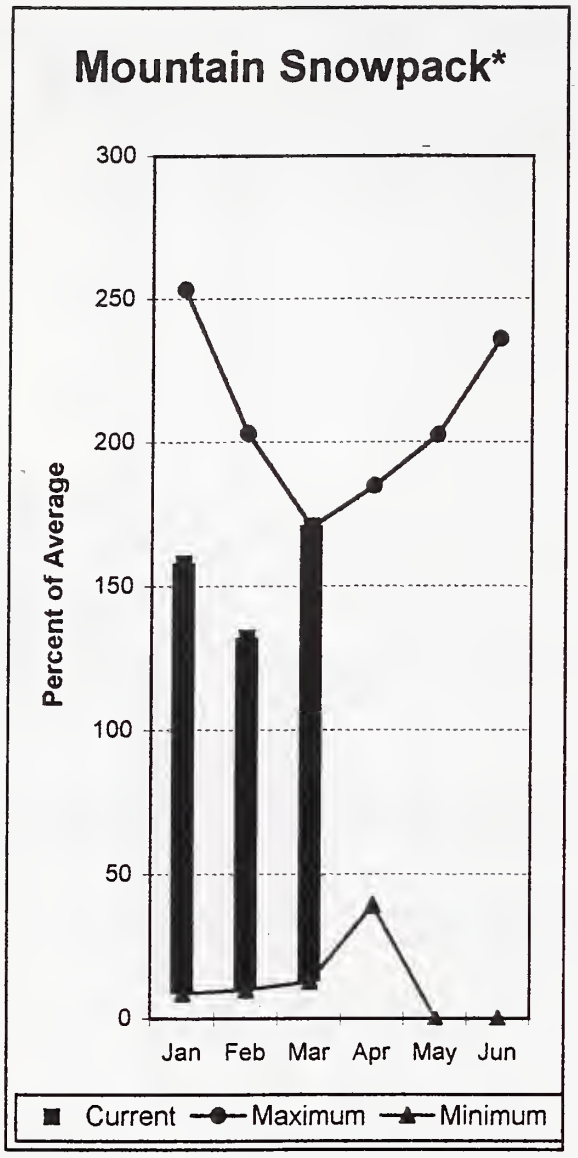
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
UPPER YAKIMA RIVER	10	165	168

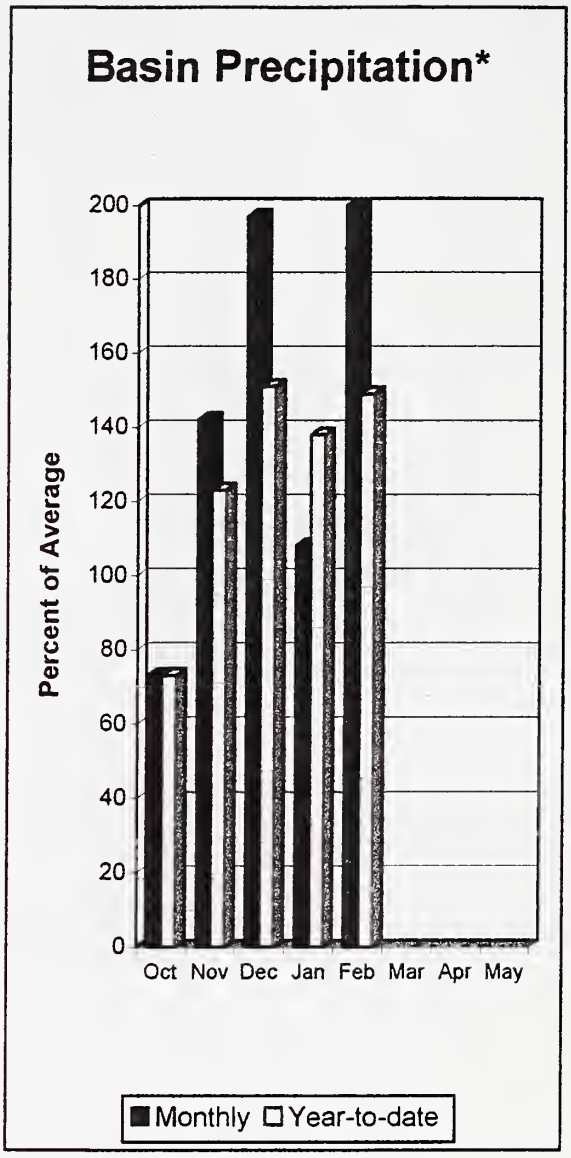
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Lower Yakima River Basin





*Based on selected stations

February streamflows within the basin were: the Yakima River near Parker, 75%; the Naches River near Naches, 65%; and the Yakima at Kiona, 89% of average. March 1 reservoir storage for the Bumping and Rimrock reservoirs was 133,000 acre feet, or 95% of average. Forecasts for the Yakima River at Parker are for 140% of average; American River near Nile, 128%; Ahtanum Creek, 128%; and the Klickitat River near Glenwood, 186%. March 1 snowpack was 174% based upon 8 snow courses and SNOTEL readings within the Lower Yakima Basin. New maximum snowpack records were set at Bumping Ridge, Green Lake, Lost Horse and Morse Lake SNOTEL sites. Precipitation was 200% of average for February and 149% for the water-year-to-date. Volume forecasts for the Yakima Basin are for natural flow. As such, they may differ from the U.S. Bureau of Reclamation's forecast for the total water supply available, which includes irrigation return flow. Temperatures for the month were 2-5 degrees above normal.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
BUMPING LAKE INFLOW	APR-SEP	157	171	180	132	189	203	136
	APR-JUL	143	156	164	132	172	185	124
	APR-JUN	117	129	137	132	145	157	104
AMERICAN RIVER near Nile	APR-SEP	135	145	151	128	157	167	118
	APR-JUL	123	132	138	127	144	153	109
	APR-JUN	102	111	117	127	123	132	92
RIMROCK LAKE INFLOW	APR-SEP	264	285	300	126	315	336	238
	APR-JUL	225	241	252	126	263	279	200
	APR-JUN	181	195	205	127	215	229	162
NACHES near Naches	APR-SEP	1019	1091	1140	137	1189	1261	832
	APR-JUL	932	996	1040	138	1084	1148	755
	APR-JUN	809	865	903	139	941	997	651
AHTANUM CREEK nr Tampico (2)	APR-SEP	41	52	59	128	66	77	46
	APR-JUL	38	47	54	128	60	70	42
	APR-JUN	32	40	46	128	52	60	36
YAKIMA near Parker	APR-SEP	2534	2693	2800	140	2908	3066	1994
	APR-JUL	2314	2452	2545	141	2638	2776	1805
	APR-JUN	2082	2195	2272	142	2349	2462	1597
KLICKITAT near Glenwood	APR-JUN	182	195	203	185	211	224	110
	APR-SEP	231	248	260	186	272	289	140

LOWER YAKIMA RIVER BASIN
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
BUMPING LAKE	33.7	9.6	8.0	10.0
RIMROCK	198.0	123.4	137.9	130.0

LOWER YAKIMA RIVER BASIN
Watershed Snowpack Analysis - March 1, 1999

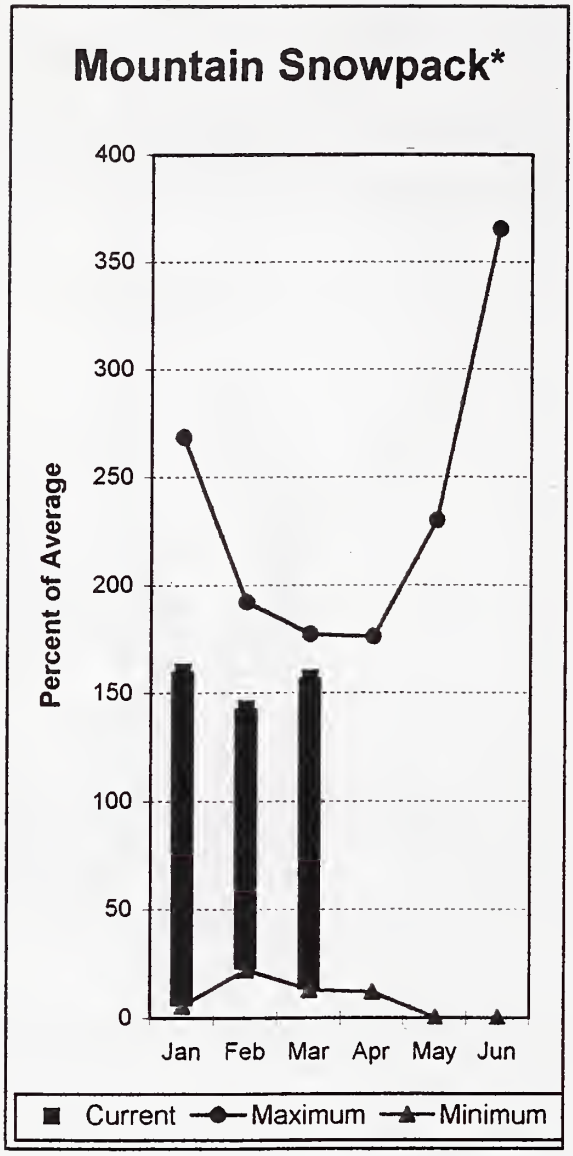
Watershed	Number of Data Sites	This Year as % of Last Yr	Average

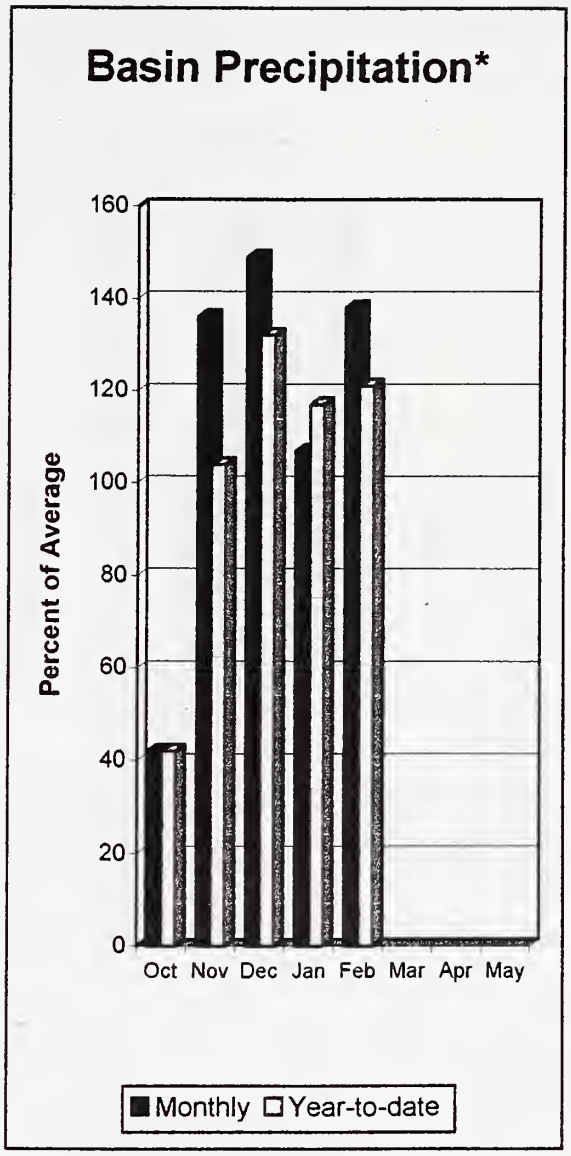
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Walla Walla River Basin





*Based on selected stations

February precipitation was 138% of average, bringing the year-to-date precipitation to 121% of average. March 1 snowpack was at 157% of average. The forecast is for 128% of average streamflow in the South Fork Walla Walla River and 183% for Mill Creek, during the coming summer. February streamflow was 172% of average for the Walla Walla River. The Touchet SNOTEL site had 48.5 inches of snow-water-equivalent. The average March 1 reading for this site is 27.8 inches. Average temperatures were about 4 degrees above normal for the area.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
MILL CREEK at Walla Walla	APR-SEP	24	28	31	183	34	39	17.1
	APR-JUL	24	28	31	183	34	38	16.9
	APR-JUN	23	28	30	182	33	38	16.7
SF WALLA WALLA near Milton-Freewater	APR-JUL	60	66	70	132	74	80	53
	APR-SEP	73	80	84	128	89	96	66

WALLA WALLA RIVER BASIN
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

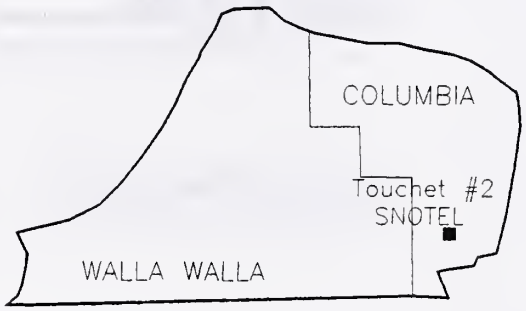
WALLA WALLA RIVER BASIN
Watershed Snowpack Analysis - March 1, 1999

Watershed	Number of Data Sites	This Year as % of Last Yr	Average
WALLA WALLA RIVER	2	197	157

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

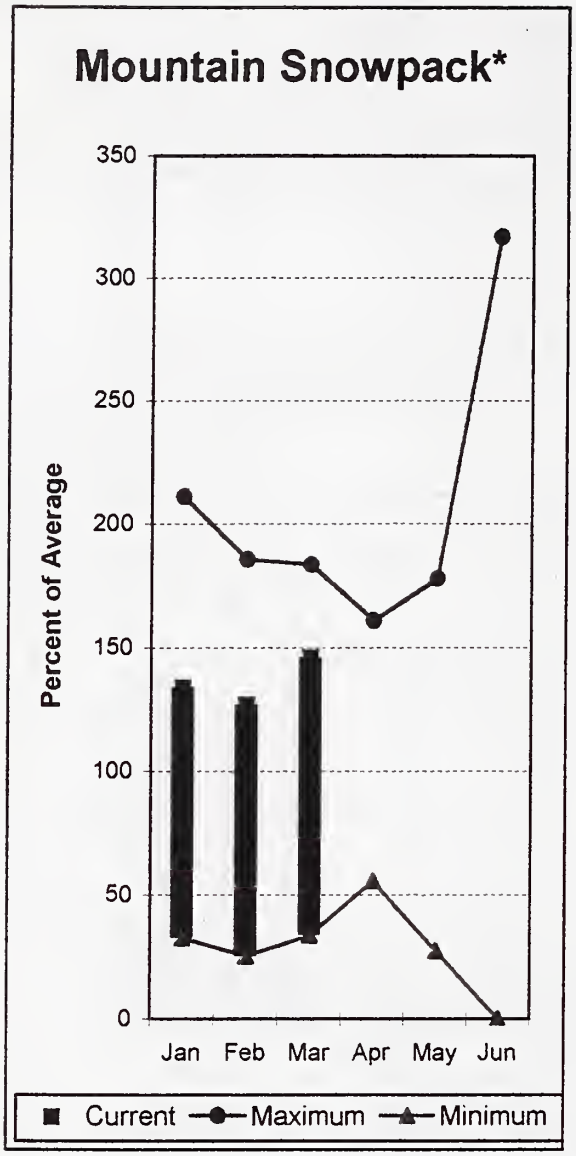


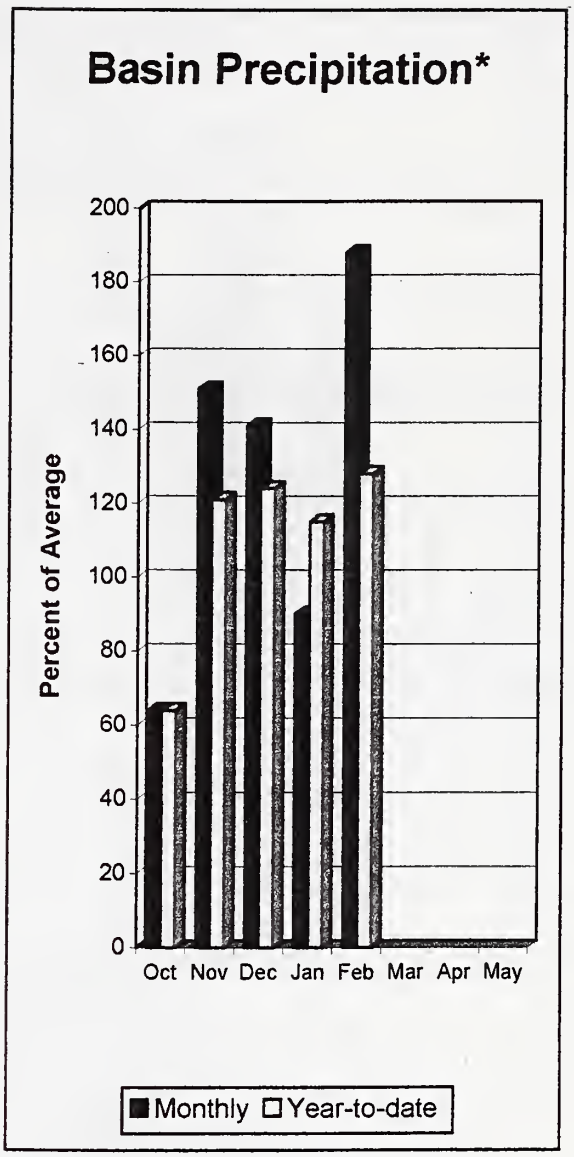
Mountain Snowpack & Precipitation
Walla Walla River Basin

Percent of Average
March 1, 1999

Snowpack - 157%
Precipitation - 153%

Lower Snake River Basin





*Based on selected stations

The April - September forecast is for 130% of average streamflow in the Snake River below Lower Granite Dam; the Grande Ronde at Troy, 138%; and the Clearwater River at Spalding, 129%. February precipitation was 188% of average, bringing the year-to-date precipitation to 128% of average. March 1 snowpack was at 146% of average. February streamflow was 96% of average for the Clearwater River; 101% for the Snake River below Lower Granite Dam; and 106% for the Grande Ronde River near Troy. Average temperatures were about 1 degree above normal for the area.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
GRANDE RONDE at Troy (1)	MAR-JUL	1580	1883	2020	137	2157	2460	1471
	APR-SEP	1411	1685	1810	138	1935	2209	1312
CLEARWATER at Spalding (1,2)	APR-JUL	7417	9070	9820	129	10570	12223	7618
	APR-SEP	7856	9606	10400	129	11194	12944	8052
SNAKE blw Lower Granite Dam (1,2)	APR-JUL	20930	25929	28200	130	30471	35470	21650
	APR-SEP	23431	29049	31600	130	34151	39769	24360

LOWER SNAKE RIVER BASIN
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

LOWER SNAKE RIVER BASIN
Watershed Snowpack Analysis - March 1, 1999

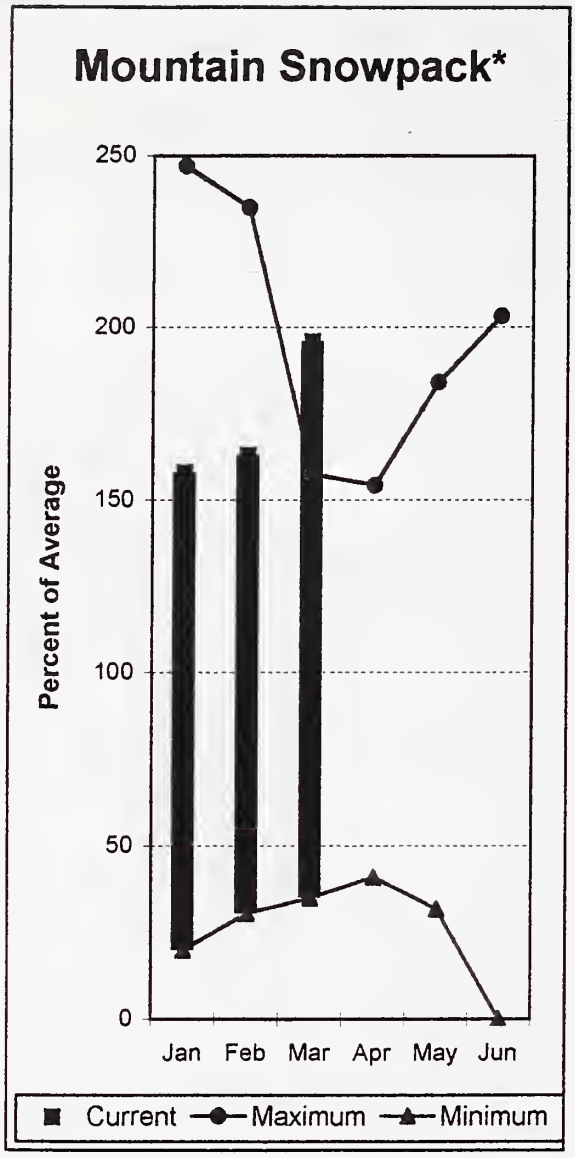
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
LOWER SNAKE, GRANDE RONDE	15	156	146

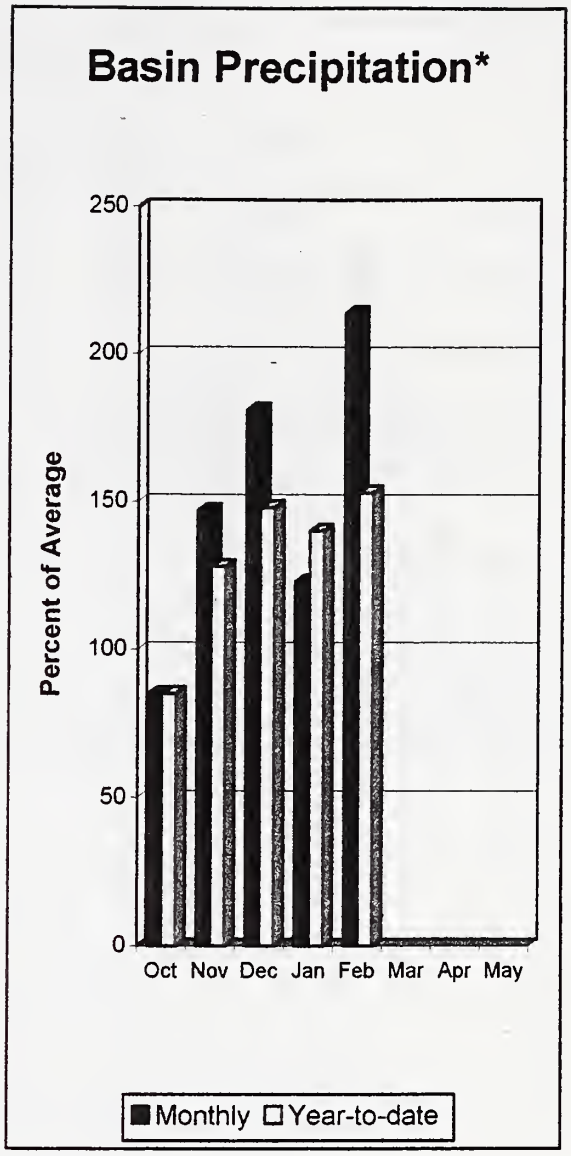
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

Cowlitz - Lewis River Basins





*Based on selected stations

The forecast for summer runoff in the Lewis River Basin is 139% of average. The forecast for the Cowlitz River at Castle Rock is for 135%, and the Klickitat River near Glenwood is 186% of average runoff. February streamflow for the Cowlitz River was 90% of average and 129% for the Lewis River. February precipitation was 214% of average, 153% of average for the water-year. March 1 snow cover for the Cowlitz River was 178%, and the Lewis River was 213% of average. Average snowpack for the combined Cowlitz - Lewis river basins was 196% of average, exceeding the previous maximum by 39%. The Paradise Park SNOTEL recorded the most water content for the basin with 83.3 inches of water. This is the second highest snowpack reading since the site was installed in 1981. Record high for Paradise Park is 86.6 inches, recorded in 1997. Average March 1 water content is 47.9 inches. Six SNOTEL sites in the basin set new maximum snowpack records for March 1. Average temperatures were near normal during February.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<Drier Future Conditions Wetter>> 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	(% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
LEWIS at Ariel (2)	APR-JUL	1191	1360	1475	140	1590	1759	1053
	APR-SEP	1389	1562	1680	139	1798	1971	1206
	APR-JUN	1041	1201	1310	140	1419	1579	935
COWLITZ R. bl Mayfield Dam (2)	APR-SEP	2003	2424	2710	138	2996	3417	1970
	APR-JUL	1762	2130	2380	138	2630	2998	1731
	APR-JUN	1511	1826	2040	138	2254	2569	1477
COWLITZ R. at Castle Rock (2)	APR-SEP	2677	3233	3610	135	3987	4543	2667
	APR-JUL	2336	2821	3150	136	3479	3964	2325
	APR-JUN	2015	2432	2715	136	2998	3415	1995
KLICKITAT near Glenwood	APR-JUN	182	195	203	185	211	224	110
	APR-SEP	231	248	260	186	272	289	140

COWLITZ - LEWIS RIVER BASINS
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

COWLITZ - LEWIS RIVER BASINS
Watershed Snowpack Analysis - March 1, 1999

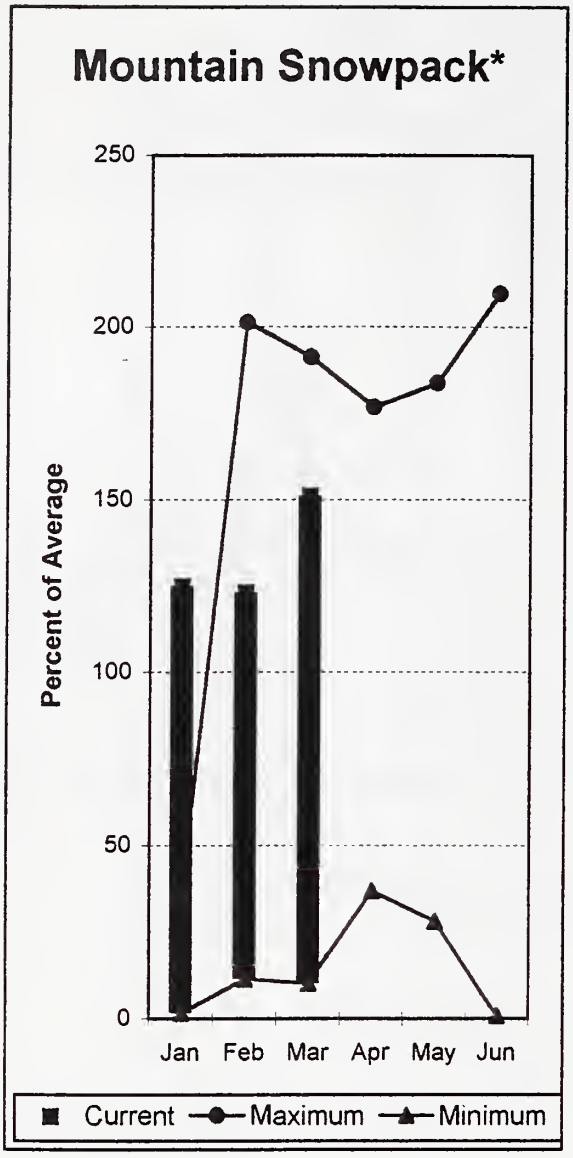
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
LEWIS RIVER	4	158	213
COWLITZ RIVER	7	154	178

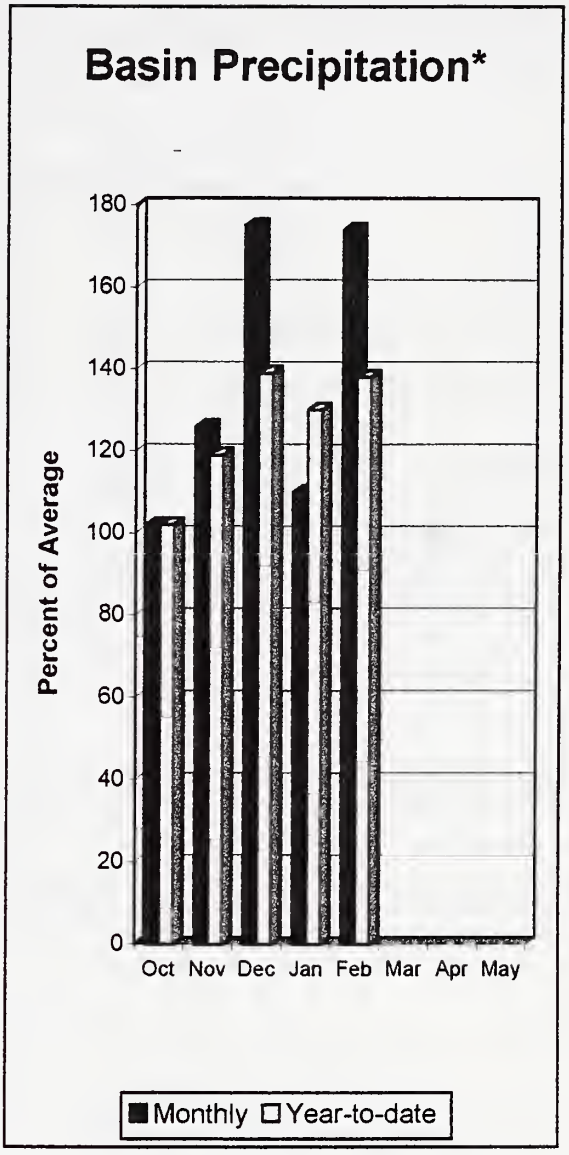
* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.

White - Green River Basins





*Based on selected stations

Summer runoff is forecast to be 115% of average for the Green River and 117% of average for the White River near Buckley. March 1 snowpack was 164% of average in the White and Puyallup river basins; and 124% in the Green River Basin. Water content on March 1 at the Corral Pass SNOTEL, at an elevation of 6,000 feet, was 42.9 inches. This site has a March 1 average of 27.6 inches. February precipitation was 174% of average, bringing the water-year-to-date to 138% of average for the basins. Average temperatures in the area were slightly below normal.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
WHITE near Buckley (1,2)	APR-JUL	433	496	525	117	554	617	447
	APR-SEP	526	602	636	117	670	746	542
GREEN below Howard Hanson (1,2)	APR-JUL	222	273	296	115	319	370	257
	APR-SEP	249	303	328	115	353	407	285
	APR-JUN	203	249	270	115	291	337	234

WHITE - GREEN - PUYALLUP RIVER BASINS
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

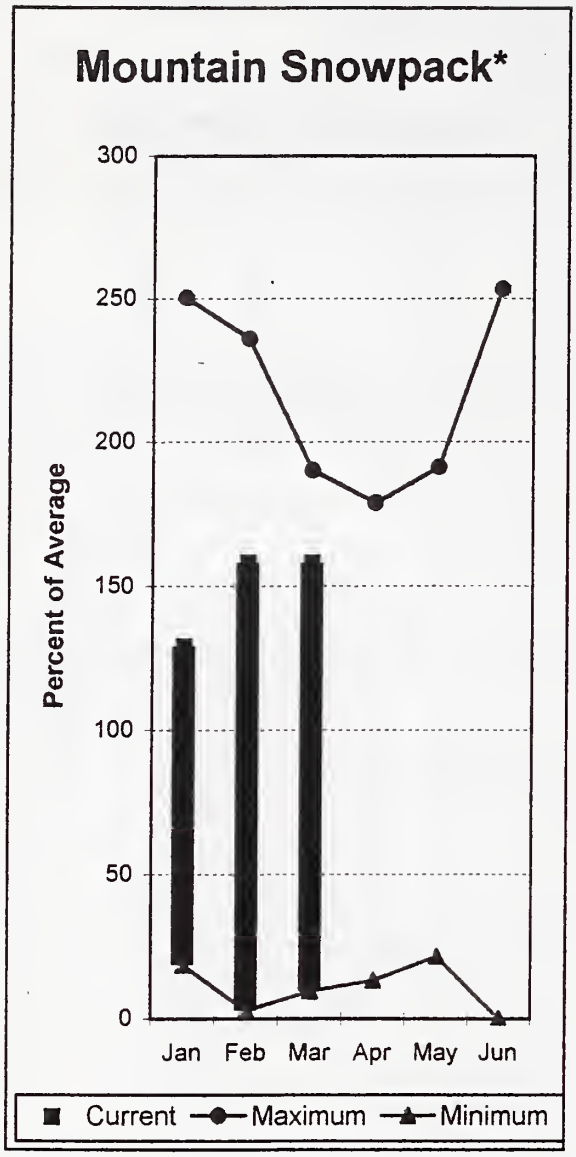
WHITE - GREEN - PUYALLUP RIVER BASINS
Watershed Snowpack Analysis - March 1, 1999

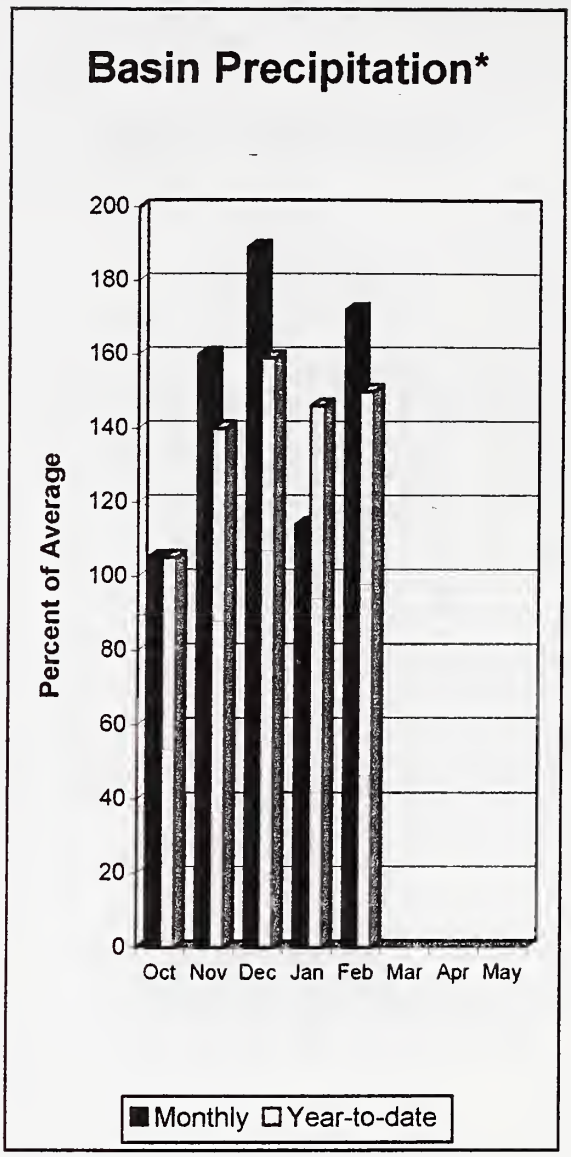
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
WHITE RIVER	3	130	164
GREEN RIVER	7	142	124
PUYALLUP RIVER	3	130	164

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.





*Based on selected stations

Forecast for spring and summer flows are 133% for the Cedar River near Cedar Falls; 139% for the Rex River; 119% for the South Fork of the Tolt River; and 137% for the Cedar River at Cedar Falls. Basin-wide precipitation for February was 172% of average, bringing water-year-to-date to 150% of average. March 1 snow cover in the Cedar River Basin was 178%; the Tolt River Basin was 150%; the Snoqualmie River Basin was 157%; and the Skykomish River Basin was 148% of average. New maximum snowpack records were set at the Mount Gardner, the Rex and the Skookum Creek SNOTEL sites. Previous records for these sites were all set 1997. Stevens Pass SNOTEL, at 4,070 feet, had 53.9 inches of water content. Average March 1 water content is 34.7 inches. February temperatures were slightly below normal.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<====== Drier ====== Future Conditions ======= Wetter =====>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
WHITE near Buckley (1,2)	APR-JUL	433	496	525	117	554	617	447
	APR-SEP	526	602	636	117	670	746	542
GREEN below Howard Hanson (1,2)	APR-JUL	222	273	296	115	319	370	257
	APR-SEP	249	303	328	115	353	407	285
	APR-JUN	203	249	270	115	291	337	234

WHITE - GREEN - PUYALLUP RIVER BASINS
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

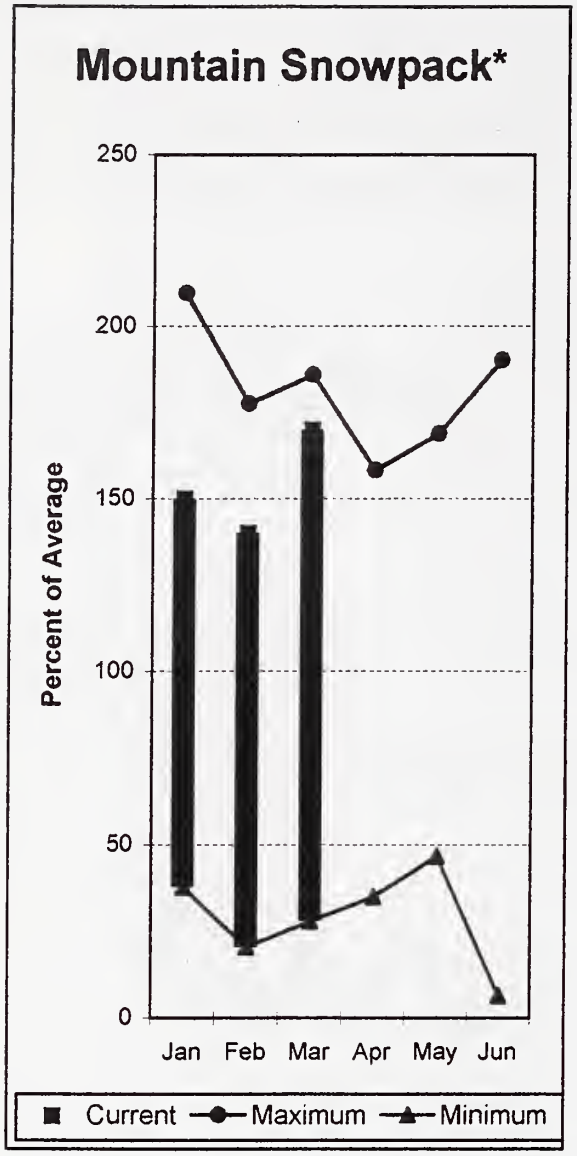
WHITE - GREEN - PUYALLUP RIVER BASINS
Watershed Snowpack Analysis - March 1, 1999

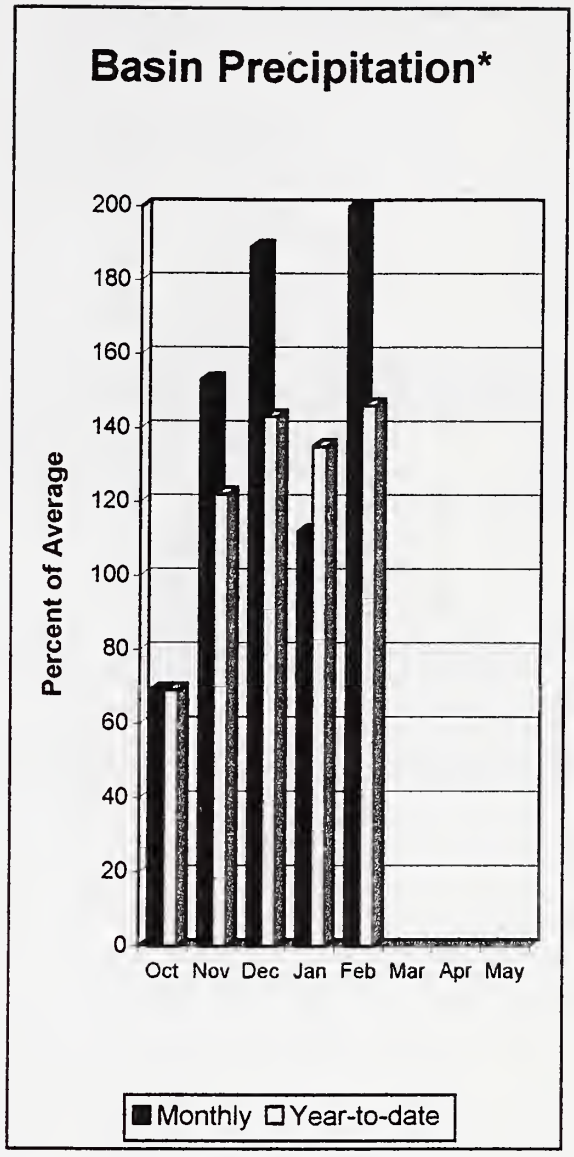
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
WHITE RIVER	3	130	164
GREEN RIVER	7	142	124
PUYALLUP RIVER	3	130	164

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.





*Based on selected stations

Forecast for the Skagit River streamflow is for 135% of average for the spring and summer period. February streamflow in the Skagit River was 88% of average. Other forecast points included the Baker River at 139%, and Thunder Creek at 127% of average. Basin-wide precipitation for February was 201% of average, bringing water-year-to-date to 146% of average. March 1 snow cover in the Skagit River Basin was 174%, the Baker River Basin was 169%, and the Nooksack River Basin was 167% of average. Rainy Pass SNOTEL, at 4,780 feet, had 53.2 inches of water content, beating the previous record set 1991 and 1996 by almost two inches. Average March 1 water content is 24.5 inches. Elbow Lake and Wells Creek SNOTEL sites also set new record snowpack levels for the Nooksack River Basin. March 1 Skagit River reservoir storage was 218% average and 48% of capacity. Average February temperatures were 2 degrees above normal for the basin.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<=== Drier === Future Conditions === Wetter ===>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
THUNDER CREEK near Newhalem	APR-JUL	266	281	292	127	303	318	230
	APR-SEP	387	405	417	127	429	447	328
	APR-JUN	157	177	190	128	203	223	149
SKAGIT at Newhalem (2)	APR-JUL	2345	2473	2560	136	2647	2775	1879
	APR-SEP	2724	2865	2960	135	3055	3196	2191
	APR-JUN	1812	1916	1986	137	2056	2160	1455
BAKER RIVER near Concrete	APR-JUL	1040	1114	1165	139	1216	1290	836
	APR-SEP	1336	1423	1483	139	1543	1630	1064
	APR-JUN	754	811	850	139	889	946	611

NORTH PUGET SOUND RIVER BASINS
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg
ROSS	1404.1	672.0	846.8	307.6
DIABLO RESERVOIR		NO REPORT		
GORGE RESERVOIR		NO REPORT		

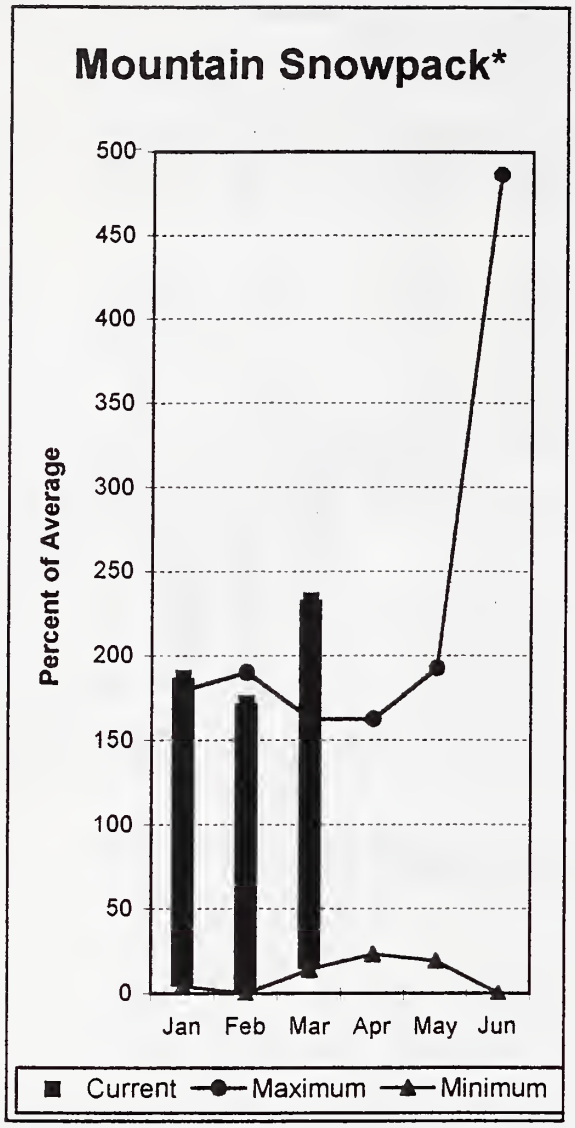
NORTH PUGET SOUND RIVER BASINS
Watershed Snowpack Analysis - March 1, 1999

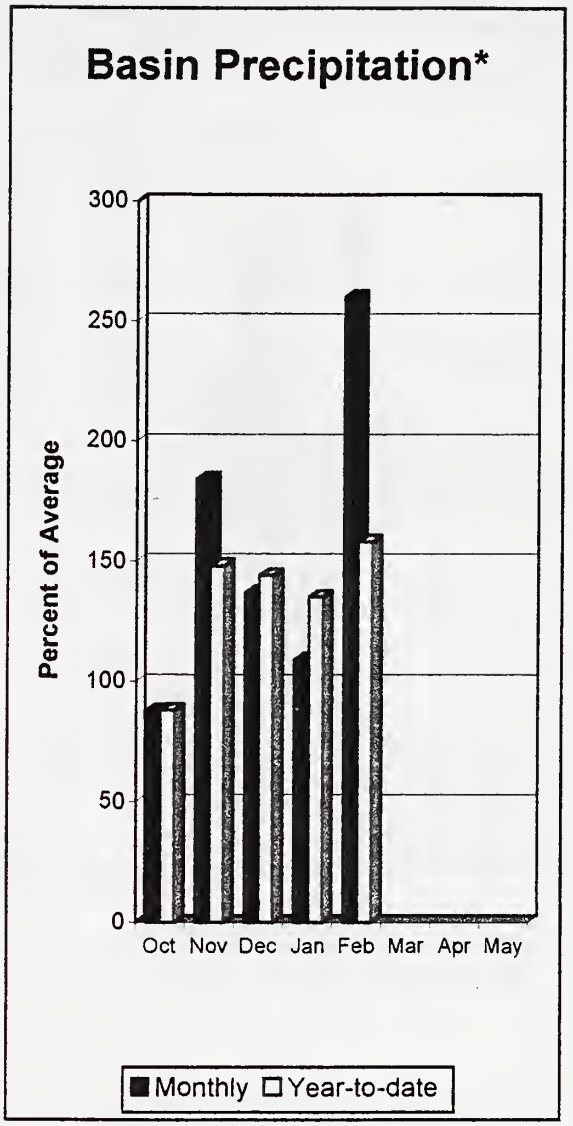
Watershed	Number of Data Sites	This Year as % of Last Yr	Average
SKAGIT RIVER	12	180	174
BAKER RIVER	2	180	169
NOOKSACK RIVER	2	195	167

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1 The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2 The value is natural flow - actual flow may be affected by upstream water management.





*Based on selected stations

March forecasts for summer runoff for streamflow in the Dungeness River Basin are 131% of average and 137% of average for the Elwha River. The Big Quilcene and Wynoochee rivers can expect much above average runoff this summer also. February precipitation was 260% of average. Precipitation has accumulated at 158% of average for the water-year. February precipitation at Quillayute was 26.2 inches. The thirty-year average for February is 12.01 inches. March 1 snow cover in the Olympic Basin was a record breaking 233% of average. The Mount Crag SNOTEL near Quilcene had 65.3 inches of snow-water-equivalent on March 1, shattering the previous record of 36.2 inches. Average for this site is 26.5 inches. The Hurricane snow course was measured to have 52.2 inches of water content and 151 inches of snow depth. The previous March 1 record water content, set in 1956 was 35.8 inches. Average March 1 water content at Hurricane is only 17.4 inches. Temperatures were 1 degree below average for the month.

For more information contact your local Natural Resources Conservation Service office.

Streamflow Forecasts - March 1, 1999

Forecast Point	Forecast Period	<<= Drier = Future Conditions = Wetter =>> Chance Of Exceeding * 90% (1000AF)	70% (1000AF)	50% (Most Probable) (1000AF)	50% (Most Probable) (% AVG.)	30% (1000AF)	10% (1000AF)	30-Yr Avg. (1000AF)
DUNGENESS near Sequim	APR-SEP	183	193	200	131	207	217	153
	APR-JUL	150	158	163	130	168	176	125
	APR-JUN	108	116	122	130	128	136	94
ELWHA near Port Angeles	APR-SEP	629	671	700	137	729	771	510
	APR-JUL	526	558	580	137	602	634	424

OLYMPIC PENINSULA RIVER BASINS
Reservoir Storage (1000 AF) - End of February

Reservoir	Usable Capacity	*** Usable Storage *** This Year	Last Year	Avg

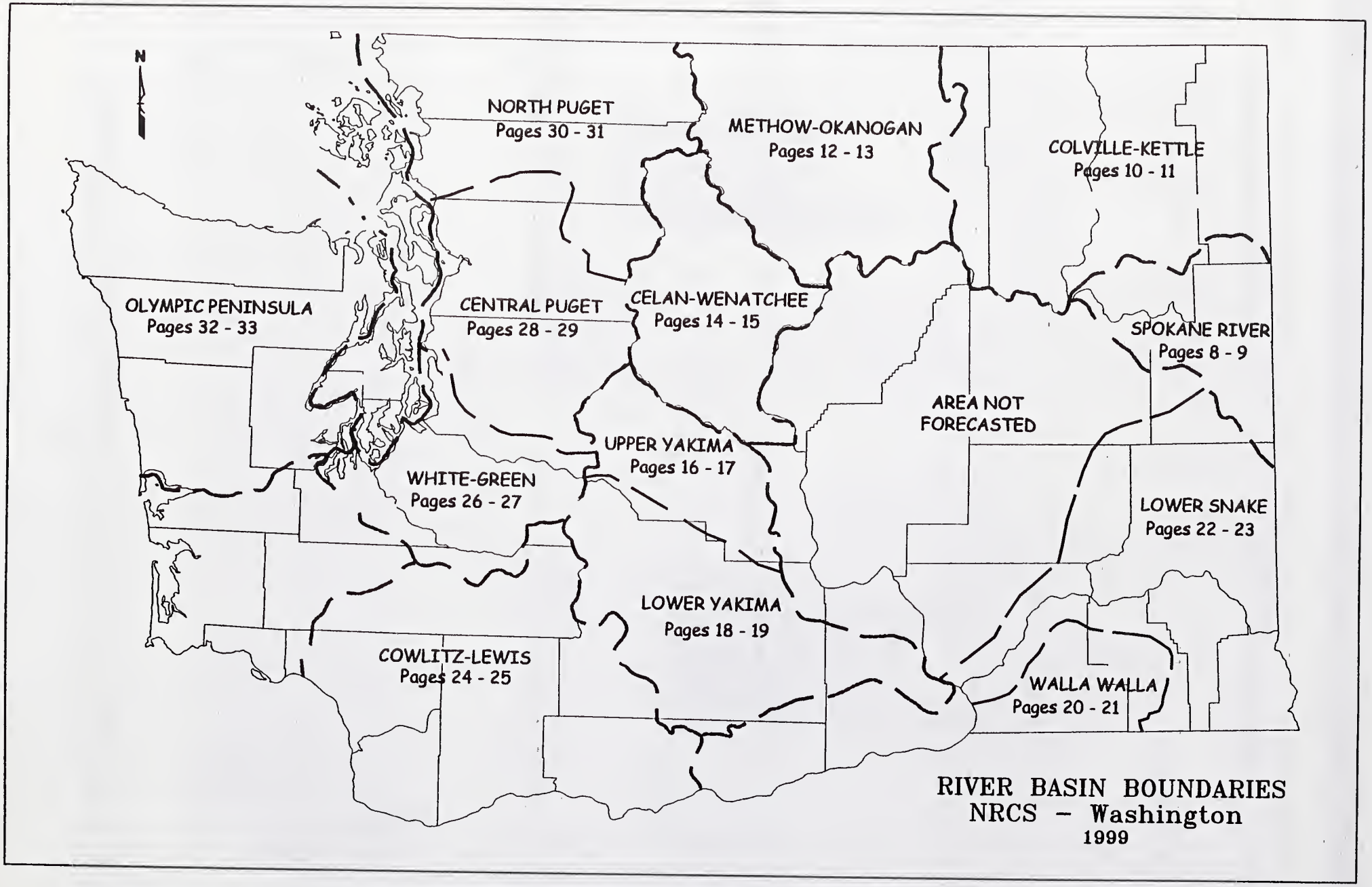
OLYMPIC PENINSULA RIVER BASINS
Watershed Snowpack Analysis - March 1, 1999

Watershed	Number of Data Sites	This Year as % of Last Yr	This Year as % of Average
OLYMPIC PENINSULA	3	185	211
ELWHA RIVER	1	254	207
MORSE CREEK	1	165	185
DUNGENESS RIVER	0	0	0
QUILCENE RIVER	1	177	246
WYNOOCHEE RIVER	0	0	0

* 90%, 70%, 30%, and 10% chances of exceeding are the probabilities that the actual flow will exceed the volumes in the table.

The average is computed for the 1961-1990 base period.

(1) - The values listed under the 10% and 90% Chance of Exceeding are actually 5% and 95% exceedance levels.
(2) - The value is natural flow - actual flow may be affected by upstream water management.


N
NORTH PUGET
Pages 30 - 31
METHOW-OKANOGAN
Pages 12 - 13
COLVILLE-KETTLE
Pages 10 - 11
OLYMPIC PENINSULA
Pages 32 - 33
CENTRAL PUGET
Pages 28 - 29
CELAN-WENATCHEE
Pages 14 - 15
SPOKANE RIVER
Pages 8 - 9
AREA NOT
FORECASTED
UPPER YAKIMA
Pages 16 - 17
WHITE-GREEN
Pages 26 - 27
LOWER SNAKE
Pages 22 - 23
LOWER YAKIMA
Pages 18 - 19
COWLITZ-LEWIS
Pages 24 - 25
WALLA WALLA
Pages 20 - 21
RIVER BASIN BOUNDARIES
NRCS – Washington
1999

Issued by

Pearlie S. Reed
Chief
Natural Resources Conservation Service
U.S. Department of Agriculture

Released by

Leonard Jordan
State Conservationist
Natural Resources Conservation Service
Spokane, Washington

The Following Organizations Cooperate with the Natural Resources Conservation Service in Snow Survey Work*:

Canada	Ministry of the Environment Investigations Branch, Victoria, British Columbia
State	Washington State Department of Ecology Washington State Department of Natural Resources
Federal	Department of the Army Corps of Engineers U.S. Department of Agriculture Forest Service U.S. Department of Commerce NOAA, National Weather Service U.S. Department of Interior Bonneville Power Administration Bureau of Reclamation Geological Survey National Park Service Bureau of Indian Affairs
Local	City of Tacoma City of Seattle Chelan County P.U.D. Pacific Power and Light Company Puget Sound Power and Light Company Washington Water Power Company Snohomish County P.U.D. Colville Confederated Tribes Spokane County Yakama Indian Nation Whatcom County Pierce County
Private	Okanogan Irrigation District Wenatchee Heights Irrigation District Newman Lake Homeowners Association Whitestone Reclamation District

*Other organizations and individuals furnish valuable information for the snow survey reports. Their cooperation is gratefully acknowledged.

FIRST CLASS POSTAGE

Washington Snow Survey Office
2021 E. College Way, Suite 214
Mount Vernon, WA 98273-2873

FOR OFFICIAL USE ONLY

Washington
Basin Outlook Report

Natural Resources Conservation Service
Mount Vernon, WA